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Original Communications.

TWO CASES OF NON-ULCERATING "ORIENTAL SORE," BETTER TERMED LEISHMAN NODULES.

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INTRODUCTORY.

THERE came recently under the care of one of us (D. B. T.) an Egyptian soldier (Case 1) with a peculiar skin lesion, the character of which is well shown in the accompanying photographs taken by Dr. Beam. The patient was sent to the Wellcome Research Laboratories, where it was suggested that it would be well to examine the contents of the skin lesions and also to make a histological examination of the growths. This was done by one of us (A. B.), with the result that large numbers of a species of Leishman-Donovan body, presumably *L. tropica,* were found; but, while some sections of the growths bore a close resemblance in their pathological histology to true Oriental sore, others presented peculiar features. Indeed, both clinically and histologically the condition was at first suggestive of that rare skin disorder which bears many different names, but is perhaps best described as benign multiple cystic epithelioma or epithelial cystadenoma of the skin. The history showed that we were dealing with a disease of considerable interest, an interest not lessened by the discovery of a second very

similar case, which in all probability had become infected from the first.

It is proposed in the present paper to discuss the condition generally, to give the clinical histories of the two cases, and to deal with the microscopic findings, leaving till a later period the account of the attempts which are being made to cultivate the parasite, the animal inoculations, the feeding experiments with insects, and the question of prophylaxis and treatment.

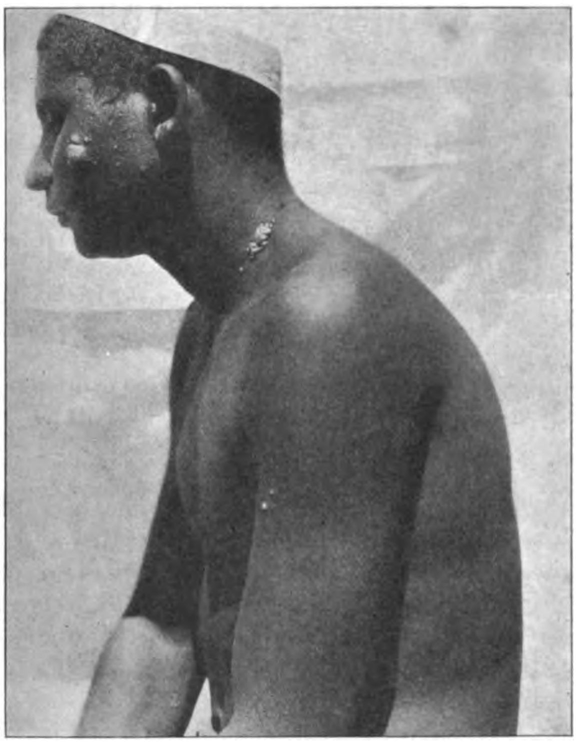

FIG. 1, CASE 1.—Growths on face, neck, and left arm.

Case 1.—A. H. (fig. 1), soldier in No. 4 Company, 16th Battalion, Egyptian Army, aged 20, an Egyptian fellah from the village of Nezli Bedeni in the Mudirieh of Minieh, Upper Egypt. He is a stoutly-built man, not very intelligent, in good condition, but not of such fine physique as is usually seen amongst the Egyptian soldiery. He has had five months' service in the Egyptian Army, the last four months of which have been spent in the Sudan.

Admitted to the Military Hospital, Khartoum, on October 9th, with soft, pink, keloid-like raised growths on the face, neck, shoulders, arms, back, and inner surface of the thigh.

Family History.—Father, aged about 70, developed similar growths six years ago, and at the present time they are more numerous and much larger on his body than on that of his son.

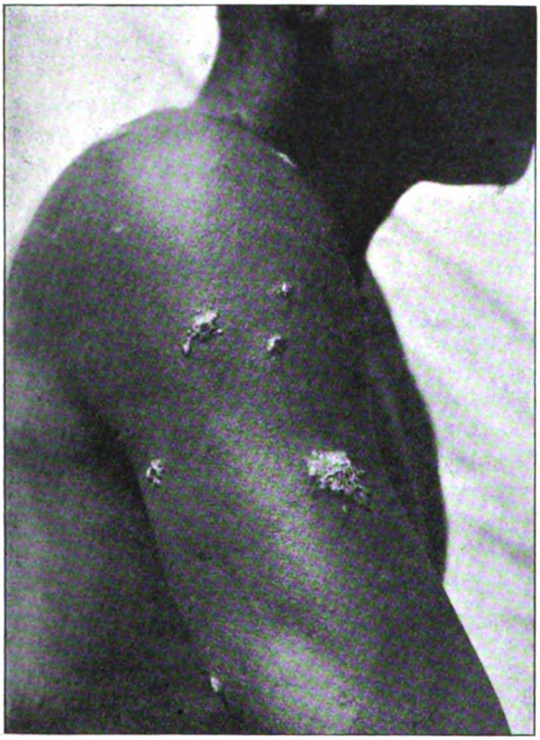

Fig. 2, Case 1.—Growths on right shoulder and upper arm. Those showing scabs have been punctured.

Since the growths appeared he has become a lunatic and has lost his hearing. The tumours are said to be in some instances many inches in diameter, and *have never showed any sign of ulceration or breaking down.* Mother dead, cause unknown. Brothers: One brother and one step-brother, neither is affected; the former, aged about 40, would appear to be phthisical. Sisters: Six in number and all unaffected save one. Eldest aged about 35; youngest aged

about 12. The eldest sister is married, and has three girls, all healthy. The second sister has two children, a boy and a girl, both healthy. The third sister has one girl who is healthy, *but the mother has for the past four and a half years suffered from the same skin disease as her brother.* She became infected when living at home, and in her case the tumours are about as numerous as in the brother's. Her husband shows no sign of the disease. The fourth sister has one girl who is healthy. The two youngest sisters are unmarried. A paternal uncle died of phthisis four years ago. An aunt, aged 75, is healthy. Patient's grandparents are dead, cause of death unknown.

Personal History.—As a child patient had small-pox. There is no history of any venereal complaint. No history could be obtained as regards the presence of insect parasites in his house or village.

History of Present Illness.—The growths, which, as will be seen, occur for the most part in groups (fig. 2), began to appear first of all upon the left side of the neck two years ago, when he was living in his native village. Then the left side of the face became infected eight months ago, followed by the right shoulder and right upper arm six months ago. Four months ago the neoplasms appeared on the outer surface of the left forearm, and fourteen days ago very small papules presented themselves on the inner surface of the left thigh about the region of Scarpa's triangle. In addition, growths, the date of appearance of which is uncertain, are present over the insertion of the left deltoid, and nearly in the centre of the back slightly to the left of the spinal column.

The growths are said by the patient to appear first as small, pink, circular points raised above the surface of the skin and of about the size of a pin's head. They grow until they reach the size of a pea, when secondary points appear to develop at the periphery of the primary growths, and as a rule separated from these latter by narrow tracts of healthy skin. These secondary tumours develop and become absorbed into the parent growths. As a result the main tumours increase in size and the whole mass takes on an irregular shape.

The patient complains that the growths itch intensely when exposed to the sun's rays, and that they pain him when pressed or when they come violently into contact with anything hard. The people of his village pronounced him "Waash," *i.e.*, unclean, and refused to eat with him.

Clinical Examination.—General appearance healthy, expression dull and apathetic, no wasting, no sign of any systemic disease,

no glandular enlargement. Heart, lungs, liver and spleen normal. Urine, no sugar, no albumin.

The growths in the situations indicated resemble nothing so much as the mountains on a relief map (fig. 3) looked on from above. There is the main elevation with spurs and ridges projecting from it, these latter representing the secondary growths

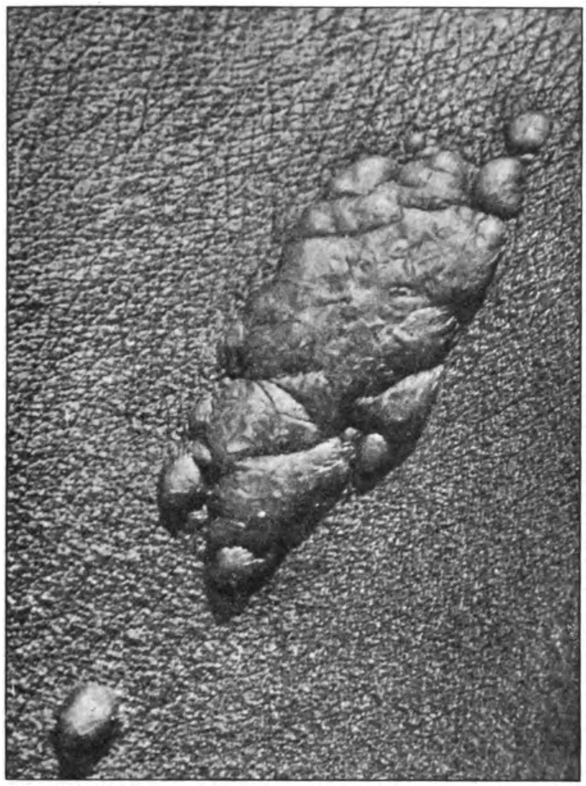

FIG. 3.—Neck growth, twice natural size.

which have united with the parent lesions. The tumours are of a definite pink colour, contrasting well with the brown pigmented skin, have a shiny aspect, are neither scaly nor ulcerated, and show no signs of breaking down. To the touch they feel smooth, firm yet soft in consistency, are easily movable, and are not adherent to the deeper tissues. When punctured they either yield blood alone, or blood with serum, or blood and a small quantity of white,

cheesy sebaceous-like material. After puncture the site of injury heals readily and a small scale or scab forms. This is well seen in fig. 2. On section, to the naked eye the growths appear fibrous.

FIG. 4, CASE 1.—Neck growth.

The following are the measurements of the growths :—

On the face	... 20 mm. x 18 mm.
On the neck	... 35 mm. x 15 mm. (figs. 3 and 4).
Over insertion of left deltoid	... 5 mm. x 5 mm.
On outer surface left forearm	... not measured—excised.
On right shoulder	... 20 mm. x 14 mm.
On right upper arm	... 29 mm. x 18 mm.
On left thigh...	... 2½ mm. x 2½ mm.
On back	... 2½ mm. x 2½ mm.

Blood Examination.—An examination of blood taken from the finger made on October 10th showed 6,050,000 red blood-corpuscles and 5,600 leucocytes. Leucopenia therefore is present. The hæmo-

globin was not determined—the blood was of a good colour. Its coagulability was markedly increased. A differential leucocyte count was made with the following result :—

Eosinophiles	11·6 per cent.
Polymorphs	57·4 ,,
Mononuclears	4·2 ,,
Large lymphocytes	8·6 ,,
Small lymphocytes	16·2 ,,
Transitionals...	2·0 ,,

With the exception, therefore, of a marked eosinophilia, the result probably of infection with metazoan parasites, so common in these fellaheen, the count was normal. No protozoal parasites of any kind were found.

Very different was the differential count in blood taken at the same time from the growth on the neck. It gave :—

Eosinophiles	2·2 per cent.
Polymorphs	26·8 ,,
Mononuclears	23·6 ,,
Large lymphocytes	40·8 ,,
Small lymphocytes	3·2 ,,
Transitionals...	3·2 ,,
Basophiles	0·2 ,,

There were many free nuclei of disintegrated mononuclears. Here, then, we find a marked increase of the larger mononuclear cells at the expense of the polymorphs. The blood was taken by means of a fine capillary pipette thrust through a small needle puncture into the depth of the growth. This slight operation was not unattended with pain, the patient wincing and complaining.

Before going further, it is interesting to compare these results with those obtained by Cardamatis [1] in several cases of Oriental sore in Greece. In three cases he took blood from the finger and from the congestive zone at the periphery of the lesions. His counts are not at all unlike those recorded above, and he found in the blood from the congestive zone the same marked increase of large mononuclear elements as we record in the case under discussion. Indeed, as regards his third case the counts are almost identical. As mentioned, blood taken from the growths by puncture and made into films in the usual way, when fixed and stained by the Leishman method, showed parasites belonging to the genus Leishmania. It was thought advisable to examine the contents

[1] J. P. Cardamatis (May 12, 1909), "Leishmaniases en Grèce (Bouton d'Orient)," *Bull. Soc. Path. Exot.*, Paris.

of nearly every one of the growths. It will be best to consider these briefly in detail.

(1) *Face Growth.*—Parasites numerous, both free and in the mononuclears; none seen in the polymorphs. Many of the mononuclears are crowded with them, thirty being no uncommon number in one cell. Some of these mononuclear cells are very large with much extra-nuclear protoplasm, and are evidently the large endothelial cells commonly found infected in cases of kala-azar and Oriental sore. The free parasites occur singly, in pairs, and in the larger groups which have been so often described by

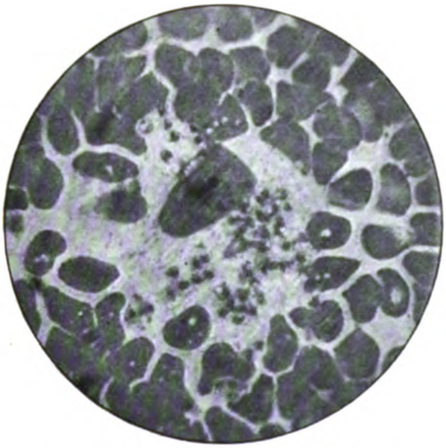

FIG. 5.—Parasites free and grouped together in the cytoplasm of a large mononucleated cell, the oblong nucleus of which alone shows distinctly. Leishman stain. × about 700 diam.

various observers. As many as twelve lying in close apposition were counted in one clump. The blepharoplasts are both rod-shaped and spherical. Single, somewhat large forms with curved blepharoplasts were noted. In addition there are small coccoid bodies which may be free nuclei or special parasitic forms, and there are also somewhat pear-shaped or wedge-shaped cells staining a light rose pink, and exhibiting each a small spherical nucleus but no blepharoplast.

(2) *Neck Growth.*—The parasites are not so numerous as in (1). They show vacuoles better, and occur both free and in the mononuclears (fig. 5). Curved blepharoplasts were again noted in some of them. Blood and white cheesy matter mixed were also obtained from this growth, kept in a sealed, sterile capillary tube for six

hours at room temperature (about 35° C.), and then smeared and stained. Parasites were found free and in mononuclears, and groups of what seemed to be large cocci were observed, as was a number of pale blue homogeneous, structureless masses with regular outlines, probably formed from the matrix of ruptured host cells.

(3) *Left Upper Arm Growth.*—Parasites fairly numerous. Coccoid bodies and pink pyriform and wedge-shaped cells present; small clumps comparatively common. A large cell noted which stains a pale blue, and contains a faint indication of what may be a large nucleus, although the latter stains more faintly than the cell protoplasm. Similar large blue cells have been seen in splenic smears from cases of kala-azar.

(4) *Left Forearm Growth* (subsequently excised).—Serum and a little blood was obtained. There were many parasites in the mononuclears. Cells like degenerated leucocytes present.

(5) *Right Shoulder Growth.*—Large numbers of parasites both free and in the mononuclears. Free clumps well seen. Degenerated white cells noted.

(6) *Right Upper Arm Growth.*—Parasites very numerous and are more spherical in shape than in the other films. Mononuclears crowded with them. Vacuoles well marked. Rod-shaped, curved, and spherical blepharoplasts. One form noted with two nuclei, a well-marked vacuole and a single curved blepharoplast. This possibly represents a dividing parasite. Some very curious masses observed, either the result of fusion or of division. A small accessory growth situated close to the main tumour also showed the parasites.

(7) *Growth on Back.*—A film made from the content of this small growth showed no parasites.

(8) *Thigh Growths.*—From these tiny tumours only white, cheesy, sebaceous-like matter was obtained. Films were made of it and coccal forms of two kinds were found, one resembling those seen in the smears of similar material from the neck growth and taking on a deeper stain than the other, which consisted of small cocci of the usual type occurring largely as diplococci.

Morphology of Parasites.—For the most part the parasites conform to the typical *Leishmania tropica*, but will probably require special and detailed description. Practically all the forms which have been described in Oriental sore are present, but careful examination will be necessary in case differences, either in structure or arrangement, exist. At present we need only mention the curved blepharoplasts, which struck us as peculiar, and the bodies

staining a rose-pink. Examination of sections stained with eosin and hæmatoxylin showed these latter to be plasma cells.

The special form of large cocci found in the growths containing no Leishmania and in the cheesy matter from the neck tumour also claim attention. They are four to six times the size of the

FIG. 6.—Section of small growth first removed showing cell-nests and cellular invasion of the rete Malpighii. Hematein stain. × 21 diam.

small cocci present, and tend to stain very feebly at their centres. Indeed, some of them present centrally placed unstained areas. They may occur in clumps or in pairs and then may resemble in some measure huge gonococci. It is not likely that they are concerned with the Leishmania infection save in the way of symbiosis.

Carter[2] has pointed out that *L. tropica* grows best in culture when associated with masses of cocci and bacteria.

Although the suggestion as regards the origin of the blue, homogeneous masses may be correct, it is curious that many of them are very regular in outline, spherical or oval, and resembling, as one

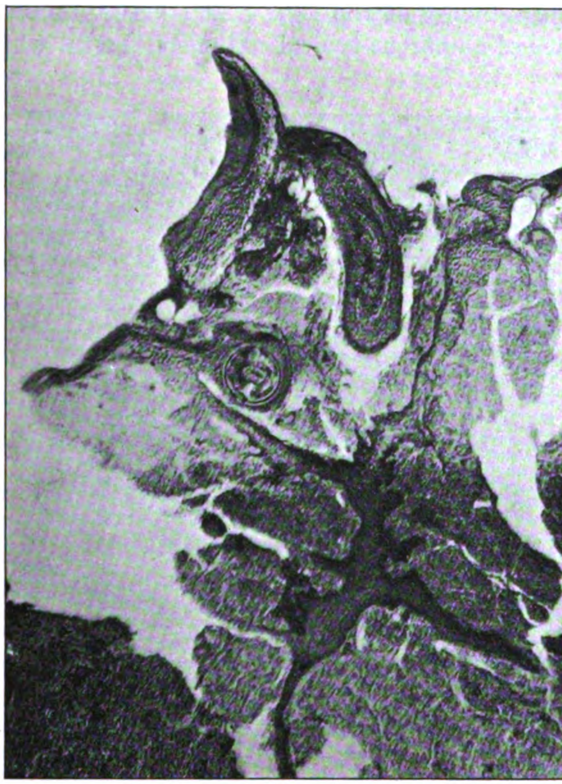

FIG. 7.—Section of small growth first removed showing proliferation of the rete Malpighii. Van Gieson's stain. × 50 diam.

may say, for want of a better term, "washed out" lymphocytes whose nuclei have vanished. The white, cheesy matter is no doubt sebaceous in origin.

Histo-pathology of Growths.—The first growth excised was a

[2] Captain R. M. Carter (September 11th, 1909), "Oriental Sore of Northern India, a Protozoal Infection," *Brit. Med. Journ.*

small one, accessory to that on the left forearm, subsequently removed.

The tissue was fixed in formol alcohol, hardened in alcohol, cleared in xylol, imbedded in paraffin, and after the usual treatment stained in a variety of ways. The earlier sections were slightly thick, and at first glance exhibited all the appearance of a squamous carcinoma of the skin. The most prominent feature is the presence of numerous typical cell-nests (fig. 6), which, according to Lazarus-Barlow,[3] may for all practical purposes be taken as diagnostic of that condition. Leaving the clinical history out of account, however, it was soon evident that we were not dealing with a malignant growth. There is an increase in the rete Malpighii, long branching columns of which stretch down into the underlying tissue (fig. 7), but there is no actual invasive process,

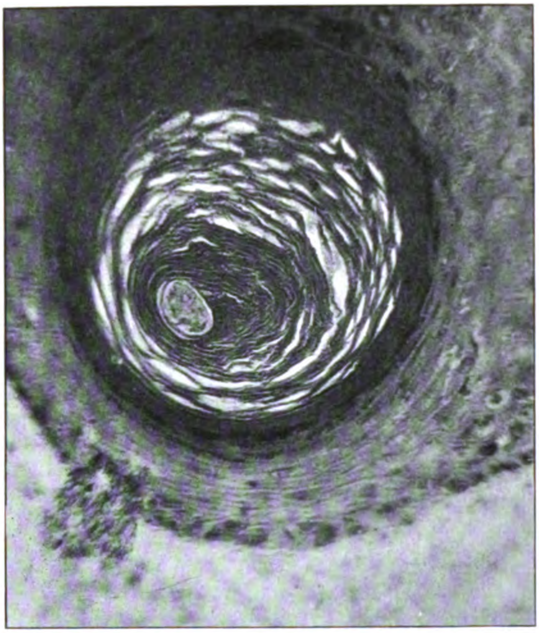

FIG. 8.—Cell-nest showing pigments in central inclusion. Van Gieson's stain. × about 100 diam.

[3] W. S. Lazarus-Barlow (1903), "The Elements of Pathological Anatomy and Histology."

and there are no isolated masses of prickle cells. In these respects the condition resembled a papilloma.[4] The cell nests, however, are most typical. At the centre of one of the nests (fig. 8) there is a clear, glistening, oval body about 28 μ by 18 μ, containing numerous grains of what is undoubtedly pigment. It is evident that there has been a hyper-chondrification of the stratum corneum, as the body stains in the same way as the horny layer, giving rise to this curious appearance, an appearance not unlike a large molluscum body, but clearer, more glistening, and, as mentioned, studded throughout with pigment. It is known that in the negro's skin pigment granules may be traced from the stratum granulosum to the outermost layers of the stratum corneum. The same is no doubt true, though to a less extent, of the Egyptian. The cells of the rete show marked perinuclear vacuolation, while the papillary layer of the skin is hypertrophied, or at least appears to be so, invading and even cutting off and disintegrating portions of the rete, while itself invaded by infiltrating cells. There are islands of cellular tissue studded about in the mass of the prickle cells (fig. 6). In these earlier sections the subepidermic tissue presents the appearance of a cellular connective tissue undergoing inflammation and some proliferation, and does not apparently conform to the descriptions in English text-books and papers of subepidermic tissue in Oriental sore, albeit examination with high powers of the microscope showed that the cytoplasm of numerous large cells with vesicular nuclei was full of Leishman bodies. These showed up best in sections stained by Van Geison's method or by hæmatin. Free parasites were also visible in the dilated capillaries, in mononuclear leucocytes lying amongst the cells, no doubt as a result of diapedesis, and between the cells themselves, presumably in the sero-fibrinous effusion. Some of the smaller vessels in this tissue showed distinct endarteritis.

At this stage one may quote the description given by Fordyce[5] of the histo-pathology of multiple benign cystic epithelioma. He says that under the microscope the tumours are seen to be "made up of irregularly rounded, oval and elongated masses and tracts of epithelial cells corresponding to those in the lowermost layer of

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[4] It is worthy of note that Bitter and Ferguson in Egypt have recently discovered a species of *Leishmania* in *ulcerated* papillomatous lesions on the limbs of Egyptian fellaheen. (See paper by Day and Ferguson in *Ann. Trop. Med. and Paras.*, vol. iii., No. 3, November 1st, 1909.)

[5] Fordyce (November, 1894), *Journ. Cutan. and Gen. Urin. Diseases.*

the epidermis and in the external root-sheath of the hair-follicle. The epithelial masses may be distinct or made up of intercommunicating bands and tracts, in some places resembling coil-ducts. *Cell 'nests' are met with as in malignant epithelioma, enclosing horny, granular and colloid tissue.* Colloid degeneration of individual cells is also encountered in the cell masses. The connective tissue about the cell collections is somewhat condensed, but is not the seat of any inflammatory process."

It must be confessed that for the most part this description applied very well to the earlier sections studied, and it was found that Allan Jamieson,[6] quoting various authorities, speaks of epithelial cystadenoma as a species of acanthoma, while the description he gives does not differ markedly from that stated above.

It will perhaps be interesting also to consider some of the latest utterances in English or American text-books on the histo-pathology of true Oriental sore.

Manson[7] says little : "Section of the papule displays an infiltration of the derma by a mass of small round granulation cells. These lie between the elements of the tissues, particularly about blood-vessels, lymphatics and sweat-glands ; towards the centre of the lesion they completely replace normal structures."

Wright[8] in his original paper states that "the lesion consists essentially of a very extensive infiltration of the corium and papillæ by cells, accompanied by atrophy and disappearance of the epidermis of the part. The infiltrating cells are plasma cells, various kinds of lymphoid cells, and large cells with single vesicular nuclei and a relatively large amount of cytoplasm in which are large numbers of the micro-organisms. These large cells, over extensive areas, are very numerous and constitute the principal part of the infiltration. They are regarded as proliferated endothelial cells."

Brooke[9] mentions the researches of Carter, Reihl, Leloir, Unna and Kuhn, "who all found it to be a chronic sero-fibrinous inflammation. There is a round-celled infiltration of the skin and subcutaneous tissue. In the centre of the nodules this infiltration is so dense that the tissue elements are entirely disintegrated. The

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[6] W. Allan Jamieson (1901), "Skin Diseases in Gibson's Text-Book of Medicine."

[7] Sir P. Manson (1907), "Tropical Diseases," Fourth Edition.

[8] J. H. Wright (December, 1903), "Protozoa in a Case of Tropical Ulcer," *Journ. Med. Research.*

[9] G. E. Brooke (1908), "Tropical Medicine, Hygiene and Parasitology."

lymphatic vessels are dilated and there is much œdema. Necrosis proceeds in the centre of the infiltrated tissue. There is cornification of the hair root-sheaths, preventing a subsequent new growth of hair at the spot. There is endothelial proliferation of the blood vessels, often leading to their entire obliteration."

Christopher and Stephens[10] in their latest edition do not deal with the subject, nor does Daniels.[11] The English translation of Scheube's work[12] has a passage much like that in Brooke's book.

"There is an infiltration of the skin and subcutaneous tissue with small round oval cells, multi-granulated and giant cells, and also a few leucocytes. In the centre of the nodules, over which the epithelium is attenuated, the infiltration is so dense that the tissue elements are entirely disintegrated, while towards the periphery the cells form small centres, mostly situated in the vicinity of blood vessels and lymphatics and sweat glands. The lymphatic vessels and spaces are uncommonly wide and there is much œdema. In the centre of the infiltrated tissue small necrotic particles are enclosed, and this, when the sections are stained, exhibits large fibrinous contents; the tissue otherwise also contains much fibrin (Unna). Those hairs that still exist are, according to Kuhn, partly broader, partly narrower, occasionally ravelled, and they always exhibit a granular appearance. The root sheaths are sometimes dilated. Here and there the inner root sheaths, and to a great extent the outer root sheaths, are also transformed into a shiny mass, probably cornified. In the connective tissue around the hair follicles cavities are found filled with shiny, flaky masses which, according to the way they are cut on section, appear of a round or oval form. In consequence of the cornification of the root sheaths no new growth of hair is possible. The blood vessels exhibit endothelial proliferation which may lead to their entire obliteration."

Firth,[13] in Allbutt's "System of Medicine," has quite a lengthy description as follows:—

"The histology of these sores has been thoroughly worked out; and if sections be made of the initial papule before ulceration no difficulty is experienced in demonstrating that the whole thickness

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[10] J. W. W. Stephens and S. R. Christophers (1908), "The Practical Study of Malaria," &c., Third Edition.

[11] C. W. Daniels (1907), "Laboratory Studies in Tropical Medicine," Second Edition.

[12] B. Scheube (1903), "The Diseases of Warm Countries," edited by J. Cantlie.

[13] R. H. Firth (1907), in Allbutt's "System of Medicine," vol. ii., Part 2.

of the skin and subjacent tissue is infiltrated with lymphoid and epithelioid (mesoblastic) cells, accompanied by more or less complete disintegration of the normal tissue elements thereby. In the centre of the papule the infiltration by young round cells is so complete that little can be seen of the sweat glands. Towards the edges of the diseased area the new cells occur in isolated clusters or groups, chiefly round the blood-vessels or lymphatics. The infiltration does not seem primarily to involve either the hair follicles or the sebaceous glands. The individual cells of this infiltration vary from 7 to 9 μ, their nuclei from 5 to 6 μ; the nuclei are large, generally single, but in parts multiple. The anatomical structure of the papule and surrounding skin indicates that Oriental sore is of the type of a granuloma; in fact the most elementary microscopical examination of the lesions shows that it is a reaction of the skin against some virus of low virulence, which has produced granulomatous changes in the corium beneath and round the ulcer. So chronic are the changes which are sometimes met with that a close resemblance to tuberculosis may be occasioned. It is important to bear this in mind, because it has several times been suggested that certain of these lesions are tuberculous. Doubtless, syphilitic and tuberculous ulcers have from time to time been placed in this group, but that there is an entity to which the term 'Oriental sore' is applicable, which is due to some virus different from syphilis and independent of tubercle bacilli, seems certain."

Jackson,[14] on the other hand, states that the pathological anatomy of tropical ulcer needs to be cleared up by further study. None of these accounts, it will be seen, mentions the presence of cell-nests, or even the increase in the rete Malpighii which was so marked a feature in the sections of the small growth first studied. We were inclined to ask if this tumour was taking on malignant features, if it was a true Oriental sore in the papular stage, or if these descriptions referred only to the ulcerative stage of the lesion. Manson's brief statement, however, distinctly mentions section of the *papule.*

Another and larger growth of four months' duration—that on the outer surface of the left forearm—was excised and examined. After excision, blood was taken from the cut surface, but no parasites were found in it, nor were they present in blood-stained serum obtained by thrusting a capillary pipette through this surface and some distance into the tumour mass. This is a point of some interest.

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[14] T. W. Jackson, *Tropical Medicine*, 1907.

Thin sections were made of the growth, and stained by Leishman's method, with Heidenhain's iron-hæmatoxylin, with hæmatin, Van Gieson's stain, eosin and methylene blue, hæmatoxylin and thionin blue, and, following Nattan-Larrier and Bussière,[15] with carbol-thionin.

FIG. 9.—Section of second growth excised showing down-growths of rete. The cellular, infected layer is well seen. Hematein stain.

The appearances presented by these sections were much more like the description quoted. There was not nearly so great a proliferation of the rete Malpighi, though here also, in some parts, a tendency to downgrowth and to the formation of cell-nests (fig. 9)

[15] L. Nattan-Larrier and A. Bussière, "Répartition des Leishmania dans le bouton d'Orient," *Bull. Soc. Path. exot.*, Paris, January 13th, 1909.

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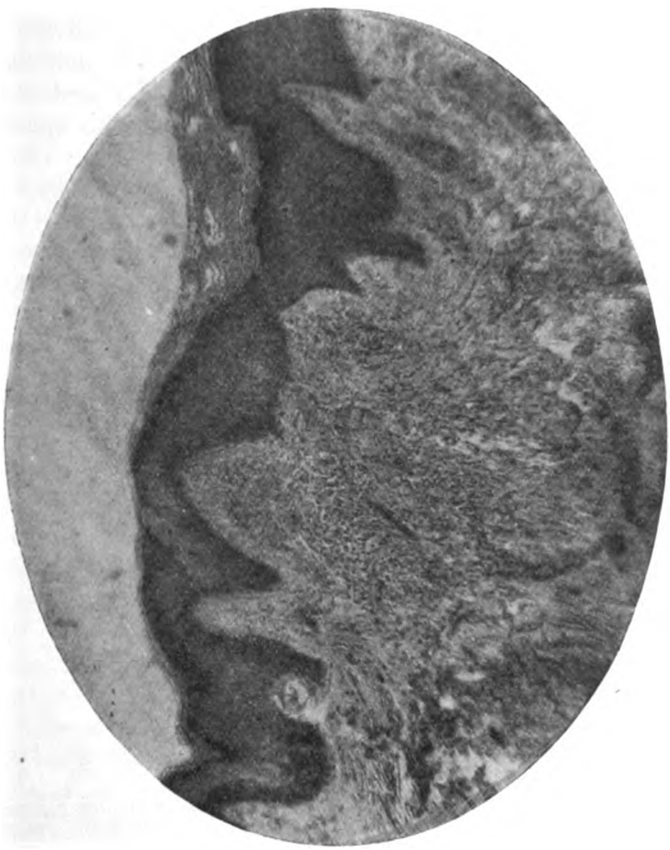

Fig. 9.—Section of second growth excised showing down-growths of rete. The cellular, infected layer is well seen. Hematein stain.

The appearances presented by these sections were much more like the description quoted. There was not nearly so great a proliferation of the rete Malpighi, though here also, in some parts, a tendency to downgrowth and to the formation of cell-nests (fig. 9)

[15] L. Nattan-Larrier and A. Bussière, "Répartition des Leishmania dans le bouton d'Orient," *Bull. Soc. Path. exot.*, Paris, January 13th, 1909.

was noted. A study of the sections stained with eosin and methylene blue, however, showed that the cells present in the subepidermic layer answered very closely to those mentioned by Wright. Indeed, all the classical signs were to be observed, and there could be little doubt that the condition was identical with that found by many observers. In these sections there were not, as a whole, nearly so many parasites as in those of the small growth first examined, and they seemed to be confined to the endothelial cells and the mononuclears, In certain areas, however, sections stained with carbol-thionin and carefully differentiated with spirit showed a heavy infection of the cells (fig. 10).

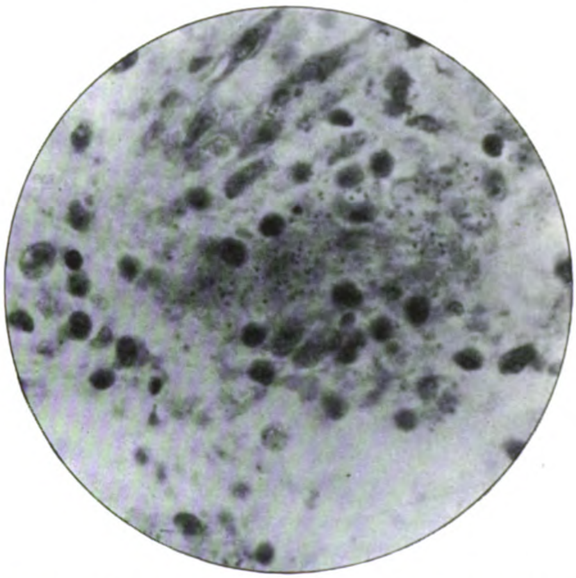

FIG. 10.—Section of larger growth on the outer surface of the left forearm. Carbol-thionin stain.

At certain points the infiltration of the epidermic layers by the round-celled growth was evident, but at most points there still persisted a considerable layer of the rete. We could find no evidence of actual necrosis, nor were giant-cells visible. It was not until we consulted the recent French work on Tropical Medicine by Jeanselme and Rist that we found a description of anything like the condition seen in the sections of the first small growth observed. There, however, we came across an excellent account of the histopathology of "bouton d'Orient." These authors state that the

dominant changes consist in a thickening of the rete Malpighii (hyperacanthosis) and an incomplete keratinization of the corneal layer (parakeratosis). The prickle cells are separated one from the other by an interstitial œdema and perinuclear vacuolation occurs. They go on to describe the state of the sub-epidermic tissue in much the same way as other writers, but lay stress on the foci of necrosis and the presence of giant-cells. Their diagrams, both of skin sections and of the periphery and centre of a typical inflammatory nodule, are very instructive, and save for the absence of cell-nests and the presence of the giant-cells, might apply to our sections of the small growth first removed and studied.

It is then, we think, evident that the skin disease under consideration is an example of what is called "Oriental sore," but it appears to be a type not prone to ulceration.[16] In this case some of the growths have been present for two years, and even when punctured tend to scab and heal immediately.[17] In the father's case the tumours have persisted unchanged, save as regards size, for six years, in the sister's case for four and a half years. The patient has been very closely questioned on these points, and is very definite in his reply.

Has such a condition been previously reported? With one exception we can find no record of such being the case. Some writers speak of the papules persisting for a long period (Cardamatis[18] mentions one of two and a half months) and others of chronic papules which abort, but in no instance is any indication given that growths may attain the size they have done in this case without showing any sign of breaking down.[19]

The exception mentioned is given by Cambillet,[20] who recently described the case of a small native boy in Algiers who presented on the right cheek a tumour which, to judge from the photograph

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[16] Is it not possible that the result depends upon the reaction of the tissue to the virus? If this be strong the epidermic layers thicken, if weak they are destroyed. It may be so, or special forms of Leishmania may produce their own specific results; or, again, symbiosis with cocci or bacteria may play a part.

[17] A portion only of the small growth showing the cell-nests was excised. The wound healed rapidly, and now the nodule presents much the same aspect as it did before part of it was removed.

[18] J. P. Cardamatis, *loc. cit.* and "Observations microscopiques sur un bouton d'Orient non ulcéré," *Bull. Soc. Path. Exot.*, Paris, July 31st, 1909.

[19] See, however, note at end of this paper.

[20] Cambillet, "Un cas de bouton d'Orient à Flatters (Alger), *ibid.*, July 21st, 1909.

given, must be almost identical with the face-growth in our case. It commenced as a small papule, increased in size until, at the time the paper was written, it measured 3 cm. in diameter and showed no sign of ulceration or discharge. It had persisted for a year in this state. On puncture it yielded blood and "*de petits grumeaux blancs*" and in smears *Leishmania tropica* was found. He concluded that the case was one of "bouton d'Orient," and certainly this term is much more applicable to his case and ours than that of Oriental sore. The latter in any case is a misnomer, as instances have been described from Bahia by Juliano Moreira, and recently from Bauru in Brazil, by Lindenberg,[21] who found Leishman bodies present. His work has been confirmed by Carini and Paranhos.[22] We think cases of this kind might with advantage be termed Leishman nodules, as the word nodules sufficiently describes the growth, and practically all are agreed that *L. tropica* plays a part, and probably the chief part, in their etiology. It is true that some are apparently anxious to abolish the term *Leishmania* as applied to the parasite altogether and substitute for it *Crithidium* or *Herpetomonas*, but the word is now so familiar and in such general use that it might with advantage be retained and applied, in its modified form, as above indicated. Apart from what has been said there is other evidence pointing to this case being one of Leishman nodules.

(1) The condition is known to occur in Egypt.

(2) Exposed parts of the skin are chiefly affected, the Egyptian fellah being accustomed to work stripped to the waist.

(3) The coagulability of the blood is increased ; markedly so.

Carter[23], however, points out that in Oriental sore more than one person of a family or household is rarely or ever attacked, while, as already mentioned, our second case, about to be described, appears undoubtedly to have derived his infection from the first, two of whose family also suffered from the disease. Gros[24], who has published an account of four cases on the Algerian littoral, is of Carter's opinion. In no instance was infection transmitted from his cases to those in contact with them. How close this

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[21] A. Lindenberg, "L'Ulcère de Bauru ou le bouton d'Orient au Brésil," *ibid.*, May 12th, 1909.

[22] Carini and U. Paranhos, "Identification de 'l'Ulcère de Baura' avec le bouton d'Orient," *ibid.*, May 12th, 1909.

[23] Captain R. M. Carter, *loc. cit.*

[24] H. Gros, "L'Ulcère à Leishmania (bouton d'Orient) sur le Littoral algérien," *Bull. Soc. Path. exot.*, Paris, June 9th, 1909.

contact is likely to have been anyone conversant with Eastern customs and usages knows; Gros concludes that *le bouton d'Orient paraît donc peu contagieux.*

The account of our second case is therefore likely to be all the more interesting.

Case 2.—Y. S., aged 21. Soldier in No. 4 Company, 16th Battalion, Egyptian Army, an Egyptian fellah from the village of Ben Abied, in the Mudirieh of Minieh, Upper Egypt. He is a sturdy son of the soil, well nourished and more intelligent than his compatriot. He enlisted on the same day as did Case 1, and for the last five months the two men have been eating together, and sleeping side by side, while they are in the same section of the same company every parade. Patient denies having ever worn the clothes or boots of Case 1.

Admitted October 30th, with growths very like those in Case 1, situated on his left thigh, right knee and left foot. On admission he was noticed also to have a small abscess below the outer canthus of his left eye. This contained pus and was evacuated. It may be said at once that no *Leishmania* were found in the pus.

Family History.—Unimportant. Nothing of interest.

Personal History.—Patient states that as a small child he was possessed of an evil spirit for a year, but otherwise has been always healthy. No venereal history is obtainable and there are no signs of venereal disease.

History of Present Illness.—The first growth on the anterior surface of the left thigh appeared four months ago, *i.e.*, one month after he came into contact with Case 1. A second lesser growth, now absorbed into the first, appeared about the same time as the a third growth, accessory to the fused first and second. A fourth on the inner surface of the right knee is three months old, and so is a fifth on the dorsum of his left foot about half an inch from the bases of his first and second toes. The tumours itch and are painful on pressure.

Clinical Examination showed the patient to be perfectly healthy with the exception of the skin lesions. These are of the same type as in Case 1. When punctured they yield blood only and films of this blood show in every instance *L. tropica.* These, however, are not nearly so numerous as in Case 1. The greatest number was found in the knee growth. They occur both free and in the mononuclears and present no special features. A good many of them appear to be smaller than those in Case 1. The tumours show no tendency to ulceration and quickly heal under a scab after

being punctured. Blood from the skin covering the growths shows no parasites.

The measurements of the growths are as follows:—

On the thigh, 1 and 2 combined	17 mm. x 12 mm.
On the thigh accessory	7 mm. x 7 mm.
On the knee	10 mm. x 10 mm.
On the foot	5 mm. x 5 mm.

Blood Examination.—The blood coagulates very rapidly. A blood count made by Captain Ensor on November 2nd showed 4,700,000 red blood corpuscles and 16,000 leucocytes. It will be remembered that the patient at this time had a boil on his face, probably the cause of the leucocytosis. After a week the leucocyte count dropped to 12,000, although the patient was being treated by Captain Ensor[25] with tincture of senega according to his method in kala-azar cases. As he was anxious to test the effect of the drug the case was handed over to him and has not been studied so fully by us as was Case 1. It is chiefly of interest in that it is an example of the transmissibility of the disease and, apparently, of the same type as the disease. What was the agent of transmission? Was it a bed bug? That is perhaps the most likely insect, for bugs (*C. lectularius*) are a common pest in barracks tenanted by Egyptian troops. Next most likely is a *Phlebotomus*, said by Pressat[26] to be blamed by the fellaheen in Egypt and regarded by Sargent and others as a possible vector.

This and other questions we would leave to a later paper, and conclude by thanking Captain Ensor, Senior Medical Officer, Khartoum, for help in connection with the cases, and Dr. Beam for the trouble he took to secure good photographs of these interesting skin lesions.

NOTE.

Since this paper was written a second article[27] by Carter has appeared in which he draws attention to the various types of Oriental sore which exist in India, mentions a non-ulcerating form, apparently not identical with that we have described, and like us takes exception to the term "Oriental sore," though without putting forward any substitute. He also refers to the possibility of there being different varieties of *Leishmania*, an observation with which we wholly agree and in the light of which we hope to study the parasites found in the skin lesions described.

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[25] Captain Howard Ensor, "The Treatment of Kala-azar by the Use of Senega," THE JOURNAL OF THE ROYAL ARMY MEDICAL CORPS, December, 1909.

[26] Pressat, "Paludisme et les Moustiques," Paris, 1905.

[27] Captain R. M. Carter, "A Note on Oriental Sore," *British Medical Journal*, November 6th, 1909.

MEDICAL HISTORY OF THE SOUTH AFRICAN WAR.

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The General Results as Regards the Incidence of Disease.

Before entering on any discussion of the incidence and varieties of disease, it may be advantageous to consider the variations in strength month by month in the whole Army and in its component parts. Details of the numbers embarked have already been given, and the diagram (No. 1) (which has been plotted from the mean of the strengths in every two consecutive months) shows how, after a steady increase to June—July, 1900, the monthly strength of Warrant and N.C.O.'s and men fluctuated considerably about a high average. The important points appear to be, first, that the strength of the Regulars and Volunteers, always the predominating element, fell on the whole steadily from June—July, 1900, to October—November, 1901, when it increased again to the end of the campaign. The sudden increase between January and April, 1901, was due to the arrival of the 2nd contingent Imperial Yeomanry and of Colonial Corps.

Wastage.—It is doubtful whether the records of strength are sufficiently accurate to admit of more than an approximation to the true wastage of an army under the conditions to which it was exposed, but for purposes of comparison with other armies they appear to be of considerable use, as in all operations of any magnitude the statistical records can only be approximate. It has been possible to extract from the tables in Appendix 5 to the Report of the Royal Commission on the War in South Africa a series of numbers of men embarked at various periods. Then by comparing the totals embarked during a period with the strength in South Africa at the end of the period, the difference between the numbers to be accounted for and the strength actually present represents the loss between the port of embarkation and South Africa, and this, in relation to the mean strength during the period, gives the rate of wastage during that period, which, for convenience of comparison, is brought up to an annual rate per 1,000. These rates are, of course, only approximate. The numbers disembarked in South Africa must always have been less than those shown as embarked, probably by only a small amount, and there is also some difficulty in separating the arrivals at the beginning and end of

each period, but as the strengths used are the mean between that in the month named and the following month, this difficulty is largely eliminated. The mean strength is the total of these monthly strengths divided by the length of the period in months.

The following results, which relate to the Warrant and N.C.O.'s. and men of the Regulars, Militia, and Volunteers, have been obtained :—

Period A : October 13th, 1899, *to December* 31, 1899.—Total of troops in and embarked for South Africa, including drafts in January, 1900, 94,531. Strength December—January, 90,681. Wastage 3,850. Mean strength during the period, 110,603. Duration of period two and two-thirds months. Wastage 34·81, or 156·64 per 1,000 per annum.

Period B : January—June, 1900.—Troops embarked, 107,946. Strength June—July, 182,344. January—February, 112,064. Increase in strength during period, 70,280. Difference between troops embarked and increase in strength gives the wastage 37,666. Mean strength, 157,661. Duration of period six months. Wastage 238·94, or 477·88 per 1,000 per annum.

Period C: July—December, 1900.—Troops embarked, 15,143. Strength July—August, 182,034. December—January, 170,943. Decrease, 11,091. Deduct City Imperial Volunteers gone home, nett decrease 10,291. Sum of troops embarked and decrease in strength gives the wastage 25,434. Mean strength, 176,318. Duration of period six months. Wastage 144·25 or 288·5 per 1,000 per annum.

Period D: January — December, 1900.—Troops embarked, 123,089. Strength December — January, 170,943. January — February, 112,064. Increase 58,879. Add half City Imperial Volunteers, say 800. Total, 59,679. Difference between troops embarked and increase in strength gives the wastage 63,410. Mean strength, 166,990. Duration of period one year. Wastage 379·72 per 1,000 per annum.

Period E: In the whole force, all classes of troops, Warrant and N.C.O.'s and men for the whole period of the War.—Killed, 5,256.[1] Died, 15,614.[1] Invalided, 72,314.[1] Total wastage from deaths and invaliding, 93,184. Numbers exposed to risk during the war, 548,237. Wastage from deaths and invaliding alone per 1,000 per annum, 169·97.

These results are more interesting if compared with the mortality from all causes during the same periods, and with the proportion of wastage not due to death.

[1] P. 99, Appendix 5, Report of Royal War Commission.

On page 24, vol. xiv., in para. beginning "Period A." read "Mean strength during the period 68597 "— "Wastage 56·14 or 252·63 per 1,000 per annum."

On page 25, top line of the table should read —

"1899 .. 252·63 .. 60·89 .. 191·74 .. 75·90 %."

Period		Ratio per 1,000 per annum						Ratio of 3 : 1	Remarks
		Total wastage 1		Mortality 2		Remainder 3		4	
1899 ..	..	156·64	..	60·89	..	95·75	..	61·13 °/o	Regulars,
1st half, 1900	..	477·88	..	76·53	..	401·35	..	83·98 ,,	Militia,
2nd ,, ,,	..	288·50	..	29·22	..	259·28	..	89·87 ,,	and
1900 ..	..	379·72	..	51·55	..	328·17	..	86·42 ,,	Volunteers.
Whole war	..	169·97	..	38·09	..	131·88	..	77·59 °/o	

The results in Column 1 of the above table show a wastage that is less than was anticipated, but the most evident feature, which is of course an obvious result, is the very material difference between the rates at different periods. The first half of the year 1900 was without doubt that in which the conditions were most severe: the relief of Ladysmith and Kimberley, the advance to Bloemfontein and Pretoria, the epidemics after the relief of Ladysmith, and in Bloemfontein and Kroonstadt all fall within this period. The wastage in war is due to several causes: deaths, invaliding, prisoners, men discharged, corps disbanded or sent home. The last lines in the table includes only losses by deaths or invaliding. The other lines include deaths and invaliding, prisoners and possibly some discharges; but the only unit which is known to have left the area of operations during the period, the City Imperial Volunteers, has been allowed for in the calculations. So that the last line is not comparable with the others; it is also probably the most accurate. Column 3, giving the wastage not due to deaths is useful, especially if taken in relation to the total loss. This relation is shown as a percentage of the total loss in Column 4. In the first period the wastage shown is somewhat in excess, as the strength includes drafts in January, 1900, which cannot be distinguished. Invaliding is the most important element in determining the total wastage, and Column 4 shows that it rose in the latter half of 1900 over the mean of the whole period as well as over the rate in the first half of the year, while it was considerably below the mean level in the war period of 1899.

On the outbreak of war, estimates of the probable wastage varied between 10 per cent. per mensem (Director of Military Intelligence) and 10 per cent. per quarter (Director-General, Army Medical Staff). These two estimates probably represented, on the one hand, the loss from all causes, and, on the other, that from deaths and invaliding. The latter estimate—10 per cent. per quarter—was accepted.[1] It appears from Column 1 that this estimate of 40 per

[1] Appendix 5, Report of Royal War Commission, pp. 81 and 89.

cent. per annum was sufficient to cover that total wastage from all causes during the whole period of 1900, but insufficient for the first half of the year. It was more than enough to make up for the wastage from *deaths and invaliding* over the whole period of the year.

The Total Inefficiency from Wastage and Men in Hospital.—Besides the wastage due to loss of men from the strength, there is also a temporary wastage due to the number of men in hospital. Our records of the admissions do not cover the whole of the sickness which occurred during the war. This deficiency is due to several causes: (*a*) The loss of the admission and discharge books from a considerable number of the smaller hospitals. Some of these losses occurred from the vicissitudes of the campaign, others in the transition stage after the end of the war; others, again, were lost in transit. Such losses probably must always occur where so many different units are established, where some of these units are occupied only for broken periods, and where the duration of operations is so great. Some of these lost records covered a considerable period of time, and must have included numerous admissions; the remainder covered short periods and included smaller numbers. (*b*) Neither the sick nor wounded of the South African Constabulary nor among civilians employed were included in our records, though the deaths are included in the total deaths during the war.

We can obtain an approximate estimate of the deficiency through a comparison of the actual number of deaths with those recorded in our returns. Messrs. Schooling and Rusher, for the purpose of a paper on "The Mortality Experiences of the Imperial Forces during the War in South Africa," read before the Society of Actuaries, prepared a list of all deaths with very great care, from two official sources, in which all duplicate deaths were eliminated. Their total of deaths among the Warrant and N.C.O.'s and men of all classes of troops for the whole period of the war shows deaths from wounds, 6,872; from illness, 14,011; or a total of 20,883, as against 20,870 as given in Appendix 5, Royal War Commission, p. 99. They limit the term "wounds" to "those from wounds or on the battlefield," and "illness" "those from other causes."

Our records show a total of 13,058 from all causes (which does not of course include those on the field), of which 1,709 were the result of wounds in action, leaving 11,349 comparable with the 14,011 of Messrs. Schooling and Rusher, showing a deficiency of 2,662 deaths which are not on our records, or 18·98 per cent. of the

total deaths from other causes than wounds. It is probable that the deficiency in the records of sickness is not so great as this; most of the hospitals whose records are missing were comparatively small units from which sick were transferred, and probably in a good many cases they first came on record at a larger hospital, while, on the other hand, the deaths were reported direct to a central authority. But one must assume that our records of sickness are deficient to the same extent as that of deaths, with the proviso that on making up the deficiency we probably obtain a maximum number of admissions.

The question of the strength on which to calculate the ratios is somewhat difficult, as there is a want of agreement between the various numbers given in the Appendices to the report of the Royal Commission. The method adopted by Messrs. Schooling and Rusher (trained actuaries), in the paper referred to above, has been followed, with some slight corrections in the numbers after revision of the schedules by the War Office. The "number exposed to risk" is, then, 548,237, including the Warrant and N.C.O.'s and men of all classes of troops. Using this as a basis, we get the ratios recorded in Column 2 of the following table. These have to be increased in the ratio of 14,011 : 11,349—*i.e.*, multiplied by 1·23455, to bring the total death-rate from our records to the true total death-rate from disease.

		Per 1,000 per annum	
	Number	Uncorrected rate	Corrected rate
Admissions	425,418	775·97	957·97
Deaths from other causes than wounds	11,349	20·70	25·58
Invalids	72,551	—	132·33
Constantly sick	12,748	23·25	28·70

The total wastage is, then, for the warrant and N.C.O.'s and men of all classes of troops for the whole period of the war as follows: wastage, 169·97; inefficiency from admission to hospital, 23·25; or a total of 193·22 per 1,000 per annum, approximately 20 per cent. The mean hospital admission-rate, 958 per 1,000, was then comparatively low. The constantly sick formed less than 3 per cent. of the strength, a rate which speaks for itself.

The following tables, compiled from our records with the correction spoken of above, show how the admission and death rates are made up :—

ADMISSIONS PER 1,000 OF STRENGTH, ALL CLASSES OF TROOPS, EXCLUDING OFFICERS.

Enteric fever	129·90	204·28	260·92	388·88
Simple continued fever	74·38			
Malarial fever	56·64			
Dysentery	85·81	127·96		
Diarrhœa	42·15			
Other diseases	454·19			454·19
All diseases	843·07			843·07
Wounds in action	47·95			114·90
Other causes not disease	66·95			
All causes	957·97			957·97

DEATHS PER 1,000.

Enteric fever	18·06	18·11	18·31	21·38
Simple continued fever	0·05			
Malarial fever	0·20			
Dysentery	3·02	3·07		
Diarrhœa	0·05			
Other diseases	3·20			3·20
All diseases	24·58			24·58
Wounds in action*	2·94			3·92
Other causes not disease	0·98			
All causes	28·50			28·50
Killed in action	9·59			9·59
Total Loss	38·09			38·09

* This ratio is calculated on the difference between the number shown as "deaths from wounds" (6,872) by Messrs. Schooling and Rusher, and the number shown as "killed in action" in Appendix 5, R.W.C., p. 99 (5,256). It differs from the numbers shown in our records, probably through differing interpretations of "killed in action" and "died out of hospital" in the case of wounds.

The case mortality per 100 admissions is important. Here the actual number of admissions and deaths which are recorded are given, and the calculations are based on the deaths in hospital only:—

DEATHS PER 100 ADMISSIONS.

Disease	Admissions	Deaths in hospital	Case mortality	Died out of hospital	Total
Enteric fever	57,684	8,020	13·90	2	8,022
Simple continued fever	33,033	23	0·07	—	23
Malarial fever	25,156	85	0·33	—	85
Dysentery	38,108	1,342	3·52	1	1,343
Diarrhœa	18,716	20	0·11	—	20
Other diseases	201,696	1,376	0·68	46	1,422
All diseases	374,393	10,866	2·90	49	10,915
Wounds in action	21,292	1,395*	6·55	314	1,709
Other causes, not disease	29,733	235	0·79	199	434
All causes	425,418	12,496	2·94	562	13,058

* See note to last table. These are the numbers recorded in our tables. In these tables, and in those to be given later, the heading, "Other causes, not disease," includes local and general injuries, poisons, poisoned wounds, "no appreciable disease," and deaths the causes of which were unknown.

The following particulars, not included above, may be useful for comparison: Proportion killed to wounded, 5,256 : 26,286[1] : : 1 : 5. Admissions for wounds : admissions for disease, 21,292 : 374,393 : : 1 : 17·58. Deaths, wounded and killed : deaths from disease, 6,872 : 13,475[1] : : 1 : 1·96.

The following table is taken from an article by Mr. A. G. Mackenzie, in the *Transactions of the Actuarial Society of Edinburgh*, 1881, with additions from the experience of recent campaigns:—

COMPARATIVE LOSSES FROM BATTLE AND DISEASE (MACKENZIE).

Campaign	Loss per cent. battle	Proportion total losses	Loss per cent. disease	Proportion total loss	Total loss per 100
Crimean War—					
English per annum	3·3	0·262	9·3	0·738	12·6
French per annum	3·4	0·219	12·1	0·781	15·5
American War—					
North, 1st year	1·7	0·254	5·0	0·746	6·7
,, 4 years	3·9	0·345	7·4	0·645	11·2
Austro-Prussian War, 1866—					
Prussian losses, 6 weeks	1·4	0·438	1·8	0·562	3·2
Franco-Prussian War	3·2	0·696	1·4	0·304	4·6
Russo-Japanese War	(13·7)	0·80	(4·1)	0·20	(17·8)
S. African War	1·25	0·330	2·46	0·670	3·8

NOTES.—The figures relating to the Franco-Prussian War are taken from Mr. Mackenzie's article, and are derived from "Die Verluste der Deutschen Armeen," by Dr. Engel, of the Royal Prussian Statistical Bureau. Those relating to the Russo-Japanese War are from a report by Lieutenant-Colonel W. G. Macpherson, C.M.G., R.A.M.C., No. 16 of the Medical and Sanitary Reports of the Officers attached to the Japanese Army. The figures in brackets are calculated on an *estimated* mean strength of 250,000 for the period of the war. The *proportion* of total losses under the two headings is calculated from the actual number of deaths during the war, given in Tables 1 and 2 of the report mentioned. These have, therefore, a greater degree of accuracy.

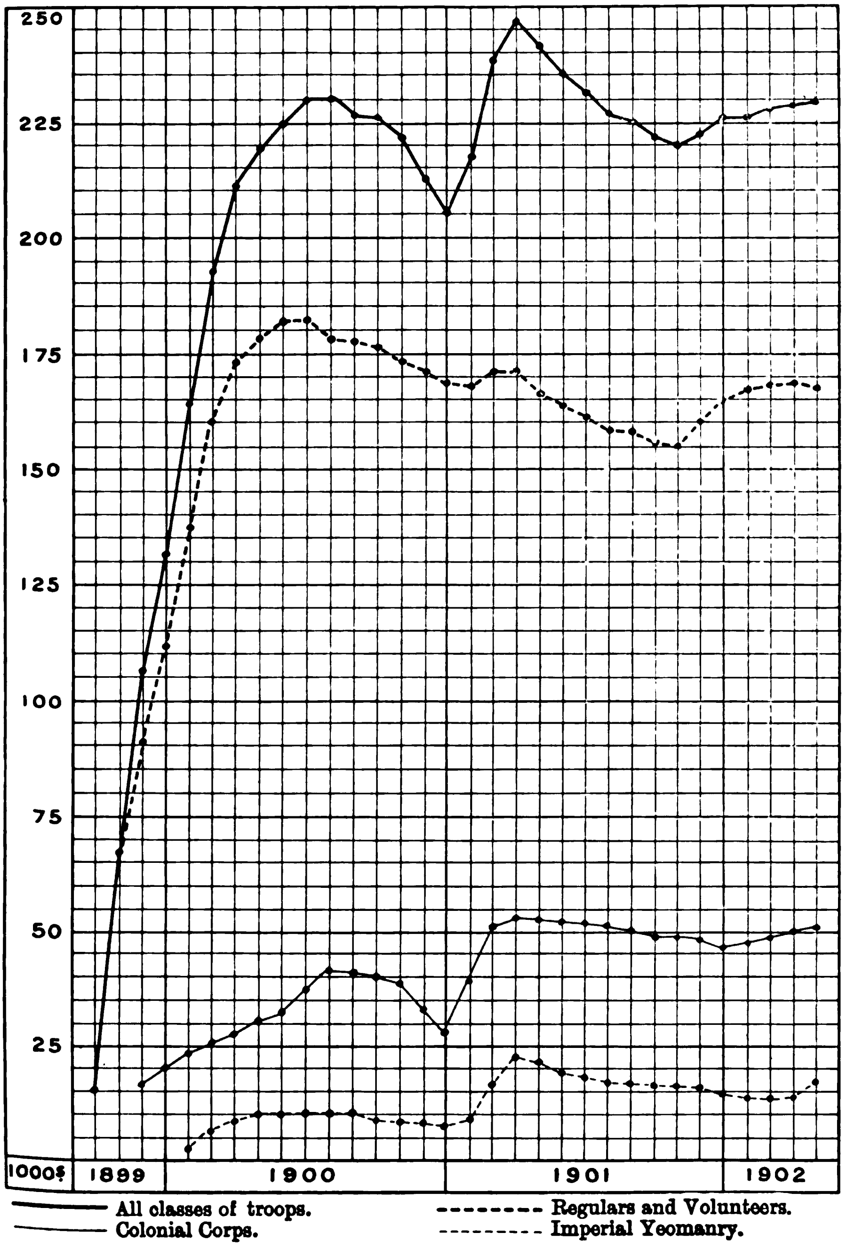
[1] These two numbers have been corrected from our records in the proportion mentioned above.

It is to be noted that in these tables the loss from disease includes what is shown in the detailed tables above as loss "from other causes not disease," which will be seen later to be not entirely negligible.

It seems interesting, and possibly important, to bring our results in the South African War into comparison with results in our previous campaigns in sub-tropical climates, those, at least, which are comparatively recent. This has been done in the following tables, compiled from the Army Medical Department Reports. It has not been possible to obtain the numbers killed in action in every case, so that the element of total loss is absent. The materials are arranged in two tables, of which the first (A) shows the admissions and deaths as ratios per 1,000 of the average annual strength; the admission rates have been given to the nearest whole number. In the second table (B) the ratios for the total admissions and deaths have been shown in the last column, while in the other columns, under each heading, is shown the percentage of the total admissions and deaths which is due to the cause shown at the head of the column — an arrangement which facilitates comparison.

Unfortunately, except in one case, the duration of the campaign was less, usually considerably less, than one year. This involves, in the first place, a statistical error, due to the multiplication of ratios which are originally derived from small numbers, and, secondly, an error in distribution, because the campaigns are limited to a portion only of the year, while, as seasonal prevalence is usually an important feature in the history of a disease, campaigns in different latitudes and at different seasons are not strictly comparable. So that it is hardly possible to regard the incidence and mortality ratios as giving more than an approximation to the actual normal morbidity and mortality under an equality of general conditions. But if these sources of error be borne in mind, it appears possible to obtain some useful information from the comparison of the figures.

In Mackenzie's table (quoted above), and in many others of similar import, stress is laid on the ratio of the loss by disease to that from battle. This is, of course, a legitimate comparison from some aspects, but it must not be diverted from its useful purpose and employed as a criterion of the excellence of the medical service engaged. Loss from battle is determined chiefly by the nature of the enemy's resistance; it depends on the clash of large masses in pitched battles, assaults, and sieges for its magnitude; it is more likely to be predominant in a short and sharp campaign



S. Africa Monthly Strengths.

than where there is a persistent resistance by numerous small bodies of the enemy. This ratio, of course, varies at different periods of one and the same campaign, *even while the death-rate from disease is declining,* as is well seen, for example, in the case of the losses among the Warrant and N.C.O.'s and men of the Regulars and Volunteers during the South African War, as follows :—

Period	Battle loss per cent.	Disease loss per cent.	Ratio	Disease loss per 1,000.
11.10.99 – 30.10.00	35·3	64·7	1 : 1·83	38·21
1.10.00 – 30.9.01	26·0	74·0	1 : 2·85	22·09
1.10.01 – 31.5.02	21·2	78·8	1 : 3·74	21·28

(Calculated from Messrs. Schooling and Rusher's Table IV., p. 27.)

The proportion of the total death-rate which is due to wounds received in action is, of course, also determined by the same conditions, but not always to the same extent. In the tables the admissions and deaths from wounds have been included, and their relative proportions shown, in order to complete the hospital records.

One of the objects with which these tables were prepared was to endeavour to ascertain whether there was any relation between the duration of the campaign and the prevalence of the continued fevers. As regards non-infective types of disease, there seems to be no reason why any relation of this kind should exist, but it will be shown later that in South Africa, as in the Cuban War, there was a limit of time during which no great development of these fevers occurred. On the other hand, there appears (at least in individual instances), to be an upper limit to the development of an epidemic, a limit determined by several factors, of which the unequal susceptibility of the individuals of the force exposed is probably one of great importance, while the development of sanitary measures after the first confusion of the beginning of the campaign may also be of the highest importance in certain instances. Taking these two elements in conjunction, the delay in development and the tendency to a limit after a certain duration or stage of development, one would expect to find the greatest prevalence in campaigns of medium duration. This, of course, assumes an equality of conditions which probably does not exist, and, indeed, is known not to exist in the campaigns under consideration. Hence probably it is that the actual results do not in any way conform to what would follow on these theoretical considerations, as may be seen from the following table :—

ADMISSIONS FOR CONTINUED FEVERS IN ORDER OF MAGNITUDE.

Less than 100 per 1,000 of strength		Duration, days	Average strength
25 China Field Force	1900-01	383	1,277
60 Mashonaland	1896-97	192	266
67 Eastern Soudan	1884	53	583
100-200 per 1,000			
143 Matabeland	1896	211	384
146 Suakin	1885	75	1,487
161 Nile Expeditionary Force	1884-85	504	7,790
168 Chitral Relief Force	1895	180	2,571
199 Nile Field Force	1889	36	150
200-300 per 1,000			
204 South African War	1889-1902	961	208,226
270 Soudan	1885-86	57	917
291 Nile Expeditionary Force	1898	255	3,510
Over 300 per 1,000			
315 Egypt	1882	85	3,036
320 Dongola Expeditionary Force	1896	205	575

Detailed examination of these tables shows that there is no correlation, either positive or negative, between the duration of the campaign and the prevalence of continued fevers—that is, that there is in them no evidence to show whether or not the duration has any influence on the total incidence.

Several points may be noted in these tables. The first is the very considerable variation in the total sickness, ranging from a minimum of 541 in the Matabele campaign, which was conducted under rather special conditions, to a maximum of 2,504 per 1,000 in the campaign of 1882 in Egypt. The arithmetical mean of the admission rate and the variability are shown in the bottom line of Table A. But this mean takes no account of the importance of individual campaign: the Nile campaign of 1889, lasting thirty-six days, with an average annual strength of 150, is of the same value as the South African War, lasting 961 days, with an average strength of 208,226. Hence a mean weighted in proportion to the troops engaged gives a better approximation. The results are summarised below:—

ADMISSIONS FROM ALL CAUSES, PER 1,000 OF STRENGTH.

Arithmetical mean	1,102	Variability, 50·46 per cent.
Weighted mean	1,061	
,, ,, less S. African War	1,148	

ADMISSIONS FROM ALL DISEASES, PER 1,000 OF STRENGTH.

Arithmetical mean	956	Variability, 46·36 per cent.
Weighted mean	946	
,, ,, less S. African War	1,050	

DIFFERENCE, EQUAL TO ADMISSIONS FROM OTHER CAUSES THAN DISEASE.

Arithmetical mean	146 per 1,000,	or 13·2 per cent.	of the total.
Weighted mean	115 ,,	10·8 ,,	,,
,, ,, less S. African War	98 ,,	8·5 ,,	,,

In the South African War itself the total admissions were 958 per 1,000 from all causes, of which 88 per cent. were on account of disease, 12 per cent. on account of other causes. These numbers compare very favourably with some of our previous campaigns. They also differ distinctly from the mean of the previous campaigns, though the difference from the mean of the whole, including the South African War, is not significant, because the latter is so enormously more important that its predominant influence cannot be brought in a proper relationship with the previous smaller campaigns. On the whole, the results in the South African War are the best we have attained so far.

It is hardly possible to compare the mortality-rates in the same way as the admission-rates, as they are conditioned by so many influences which differ from those influencing the admission-rates, but which, like them, vary from campaign to campaign. The most important influence is the proportion of deaths from wounds in action, seen at its maximum in the campaign in the Eastern Soudan in 1884, where all the deaths were due to wounds. The proportion of deaths from wounds bears a general relation to the numbers killed in action, and like it, depends on the nature of the resistance of the enemy.

One other point to notice is the occasional importance of other causes than disease or wounds in leading to inefficiency and death, especially in Mashonaland, 1896 (admissions), China, 1900 (deaths), and the Nile Field Force, 1889 (deaths).

The most important items in the table are the incidence and mortality rates for the continued fevers.

	Incidence	
Arithmetical mean	182	.. Variability, 51·24 per cent.
Weighted mean	202	
,, ,, less S. African War	200	

Here, again, the South African figures (204) compare favourably with individual campaigns, but do not differ materially from the weighted mean of the series. There is little to be gained by discussing the vexed question of the past, the differential diagnosis of enteric from the other continued fevers met with under war conditions; the most effective commentary is a statement of the case mortality in each campaign taken in order of date.

Campaign	Enteric Fever Cases	Enteric Fever Deaths	Case mortality	All Continued Fevers Cases	All Continued Fevers Deaths	Case mortality	Ratio enteric. All continued fevers, %
Egypt, 1882	118	27	22·9	956	28	2·9	12·3
E. Soudan, 1884	39	—	—	39	—	—	100·0
Nile, 1884	760	277	36·4	2,395	283	11·8	31·7
Suakin, 1885	88	11	12·5	217	11	5·1	40·6
Soudan, 1885-86	95	17	17·9	248	17	6·8	38·3
Nile, 1889	5	1	20·0	30	1	3·3	16·6
Chitral, 1895	326	94	28·8	431	94	21·8	75·6
Matabele, 1896	34	11	32·3	55	11	20·0	61·8
Dongola, 1896	40	20	50·0	184	20	10·9	21·7
Mashona, 1896-97	16	—	—	16	—	—	100·0
Nile, 1898	299	83	27·8	1,021	83	8·1	29·4
China, 1900	26	10	38·4	32	10	31·2	81·2
S. African War	57,684	8,020	13·9	90,717	8,043	8·9	63·5

The results are summarised below.

ENTERIC FEVER ALONE: DEATHS PER 100 ADMISSIONS.

(1) 12 Campaigns .. Cases, 1,846 .. Deaths, 551 .. Case mortality, $29·85 \pm 0·72$ per cent.
S. African War .. ,, 57,684 .. ,, 8,020 .. ,, $13·90 \pm 0·097$,,
Actual difference .. 15·95 per cent.
Probable difference .. 0·73 ,,
(2) Arithmetical mean of the whole series .. .. $23·15 \pm 2·56$ per cent.
(3) Weighted mean (weighted relatively to the number of cases.)
Whole series .. .. 18·24 per cent.
,, ,, less S. African War .. .. 26·81 ,,

NOTES.—(1) Gives probably a fairly accurate means of comparison, for the campaigns showing a heavy case mortality on a small incidence are compensated for by those having none; that is, *the case mortality in the South African War was certainly less than half that experienced in the series of previous campaigns.* (2) Gives too great prominence to individual campaigns. (3) Is probably the most accurate method of comparison, showing the very great influence of the South African War in reducing the average case mortality over the whole series.

ALL CONTINUED FEVERS: DEATHS PER 100 ADMISSIONS.

12 Campaigns .. Admissions, 5,624 .. Deaths, 558 .. Case mortality, $9·92 \pm 0·27$ per cent.
S. African War .. ,, 90,717 .. ,, 8,043 .. ,, $8·87 \pm 0·06$,,

Here the difference between the two case mortalities is small, but significant. The inference is that, *under any circumstances the cases of greater severity, those most likely to prove fatal, are diagnosed enteric fever.*

The case mortality from enteric fever alone in the South African War is, without doubt, the lowest case mortality of statistical value which we have ever obtained in the field. Case mortality in enteric fever in different campaigns depends essentially on diagnosis, and the statistical results confirm the opinion formed during the campaign, that the diagnosis of enteric fever was carried out more freely than has ever been done before. Of the total number of cases of continued fever admitted to hospital, 63·5 per cent. were returned

as enteric fever, a proportion which previous experience in South Africa had shown to be probably accurate. In the comparison with some other campaigns, such as Chitral and China, one has to remember the possible confusion with malarial fevers, which, on the whole, tends to diminish the continued fever class.

Working back from the case mortalities to the admission-rates, it seems probable that our admission-rates in South Africa for enteric fever have to be diminished by a considerable percentage to allow of their comparison with the results in previous campaigns: probably a diminution of about 30 per cent. would not be too great. But, at the same time, it must be remembered that the South African results probably approximate to the true incidence under such conditions, while in the other campaigns the incidence has been under-estimated.

DYSENTERY.

Only eleven campaigns are available for comparison here. In the others no particulars are given. For the proper comparison of diseases in this group, diarrhœa should also be shown, but it has not been possible to get a series of figures for this item. Taking dysentery alone, the following are the means for the admissions per 1,000 of strength :—

Arithmetical mean	113·5	..	Variability 57·95 per cent.
Weighted mean, whole series ..	105		
,, ,, less S. African War	128		

The admission-rate in the South African War, 86 per 1,000, compares well with most of the previous campaigns, and its influence is evident in reducing the weighted mean.

As regards the case mortality, there are no very great variations in the series—that of the South African War, 3·52 per cent., is about the average of the previous campaigns. The remaining items do not call for any special consideration at this point.

TABLE A.—RATIOS PER 1,000 OF STRENGTH. ADMISSIONS AND DEATHS.

Campaign	Duration, days	Average annual strength	Continued Fevers. Enteric		Other		Total		Dysentery		Other disease		All disease		Wounds in action		Other causes, not disease		Total	
			Adm.	D.	Adm.	D.	Adm.	D.	Adm.	D.	Adm.	D.	Adm.	D.	Adm.	D.	Adm.	D.	Adm.	D.
Nile Field Force, 1889	36	150	33	6·6	166	..	199	6·6	73	..	378	..	650	6·6	33	6·6	93	6·6	776	19·8
Eastern Soudan, 1884	53	583	..	..	..	..	67	..	..	..	397(*a*)	..	464	..	339	1·7	74	..	877	1·7
Soudan, 1885-86 ..	57	917	103	18·5	167	..	270	18·5	138	4·4	631	3·3	1,040	26·2	47	7·6	60	3·3	1,147	37·1
Suakin Expeditionary Force, 1885	75	1,487	59	7·4	87	..	146	7·4	..	..	1,151(*a*)	3·4	1,297	10·8	67	31·6	80	0·6	1,444	43·0
Egypt, 1882 ..	85	3,036	39	8·9	276	0·3	315	9·2	230	6·9	1,731	8·2	2,276	24·4	125	3·6	103	1·7	2,504	29·7
Chitral Relief Force, 1895	About 180	2,571	127	36·6	41	..	168	36·6	220	7·8	1,088	5·0	1,476	49·4	14	5·0	54	0·4	1,544	54·8
Mashonaland, 1896-97	192	266	60	..	..	..	60	..	128	..	387	3·8	575	3·8	53	15·0	207	..	835	18·8
Dongola Expeditionary Force, 1896	205	575	70	34·8	250	..	320	34·8	16	1·7	556	38·2	892	74·7	..	..	83	7·0	975	81·7
Matabeleland, 1896	211	384	88	28·6	55	..	143	28·6	68	..	263	..	474	28·6	10	2·6	57	..	541	31·2
Nile Expeditionary Force, 1898	255	3,510	85	23·6	206	..	291	23·6	165	4·6	499	3·4	955	31·6	57	15·7	46	4·5	1,058	51·8
Zulu War, 1879 ..	273	9,462	..	..	..	..	295(*b*)	18·5	161(*c*)	5·8	..	..	..	..	17	2·4	532(*d*)	5·9	1,005	32·6
China Field Force, 1900-01	383	1,277	20	7·8	5	..	25	7·8	63	1·6	845	3·9	933	13·3	10	2·3	119	9·4	1,062	25·0
Nile Expeditionary Force, 1884-85	504	7,790	51	18·6	110	0·4	161	19·0	62	4·0	334	3·1	557	26·1	16	2·8	27	2·7	600	31·6
S. African War, 1899-1902	961	208,226	130	18·1	74	0·0	204	18·1	86	3·0	553	3·4	843	24·6	48	2·9	67	1·0	958	28·5
Arithmetical mean*	..	..	..	..	..	..	182·22 ± 17·47		113·5 ± 13·37		..	..	956 ± 90		..	..	..	..	1,102 ± 95	
Variability*	..	..	..	..	..	..	51·24 %		57·95 %		..	..	50·50 %		..	..	..	..	50·46 %	

* Refer to admissions only. (*a*) Includes dysentery. (*b*) Includes malarial fever. (*c*) Includes diarrhœa.
(*d*) Includes also diseases not already mentioned..

TABLE B.—TOTAL INCIDENCE AND MORTALITY PER 1,000, AND PERCENTAGE OF THESE RATIOS DUE TO THE CAUSES NAMED.

Campaign	Duration, days	Average annual strength	Continued Fevers: Enteric Adm.	Enteric D.	Other Adm.	Other D.	Total Adm.	Total D.	Dysentery Adm.	Dysentery D.	Other disease Adm.	Other disease D.	All disease Adm.	All disease D.	Wounds in action Adm.	Wounds in action D.	Other causes, not disease Adm.	Other causes, not disease D.	Ratios of strength per 1,000 Adm.	Ratios of strength per 1,000 D.
Nile Field Force, 1889	36	150	4·2	$\frac{1}{3}$	21·4	..	25·6	$\frac{1}{3}$	9·4	..	48·8	..	83·8	$\frac{1}{3}$	4·2	$\frac{1}{3}$	12·0	$\frac{1}{3}$	776	19·8
Eastern Soudan, 1884	53	583	..	..	..	..	7·6	..	..	..	45·2(a)	..	52·8	..	38·8	100·0	8·4	..	877	1·7
Soudan, 1885-86 ..	57	917	9·0	49·9	14·5	..	23·5	49·9	12·1	11·8	55·0	8·9	90·6	70·6	4·1	20·5	5·2	8·9	1,147	37·1
Suakin Expeditionary Force, 1885	75	1,487	4·1	17·2	6·0	..	10·1	17·2	..	..	79·8(a)	7·9	89·9	25·1	4·6	73·5	5·5	1·3	1,444	43·0
Egypt, 1882	85	3,036	1·6	30·0	11·0	1·1	12·6	31·1	9·2	23·3	69·0	27·8	90·8	82·2	5·0	12·2	4·1	5·6	2,504	29·7
Chitral Relief Force, 1895	About 180	2,571	8·2	66·7	2·7	..	10·9	66·7	14·2	14·2	70·5	9 2	95·6	90·1	0·9	9·2	3·5	0·7	1,544	54·8
Mashonaland, 1896-97	192	266	7·2	..	..	..	7·2	..	15·3	..	46·4	20 0	68·9	20·0	6·3	80·0	24·8	..	835	18·8
Dongola Expeditionary Force, 1896	205	575	7·1	42·6	25·7	..	32·8	42·6	1·6	2·1	57·1	46·8	91·5	91·5	..	..	8·5	8·5	975	81·7
Matabeleland, 1896..	211	384	16·4	91·6	10·1	..	26·5	91·6	12·5	..	48·5	..	87·5	91·6	1·9	8·4	10·6	..	541	31·2
Nile Expeditionary Force, 1898	255	3,510	8·0	45·6	19·4	..	27·4	45·6	15·6	8·8	47·1	6·6	90·1	61·0	5·4	30·2	4·4	8·8	1,058	51·8
Zulu War, 1879 ..	273	9,462	..	..	..	..	29·3(b)	56·6	16·0(c)	17·8	..	..	..	..	1·7	7·4	53·0(d)	18·1	1,005	32·6
China Field Force, 1900-01	383	1,277	1·9	31·3	0·4	..	2·3	31·3	5·9	6·2	79·5	15·6	87·9	53·1	1·0	9·4	11·1	37·4	1,062	25·0
Nile Expeditionary Force, 1884-85	504	7,790	8·5	58·8	18·3	1·3	26·8	60·1	10·3	12·7	55·8	9·8	92·9	82·5	2·7	8·9	4·3	8·5	600	31·6
S. African War, 1899-1902	961	208,226	13·6	63·5	7·7	0·2	21·3	63·5	9·0	10·5	57·7	12·0	88·0	86·0	5·0	10·2	7·0	3·1	958	28·5

(a) Includes dysentery. (b) Includes malarial fevers. (c) Includes diarrhœa. (d) Includes also diseases not already mentioned.

NOTES ON MILITARY MAP READING.

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(*Continued from p.* 652, *vol. xiii.*)

HILL FEATURES.

VARIOUS methods are employed in map drawing to represent hill features.

(1) *Hachuring*, "a conventional method of representing hill features by shading in short, disconnected lines drawn directly down the slopes in the direction of the flow of water on the slopes." Where the slope is steeper these lines are drawn closer together; consequently, the shading appears darker than where the slope is more gradual.

(2) *Layer System.*—In this system different shades of the same colour, or different shades of two colours, are used to indicate

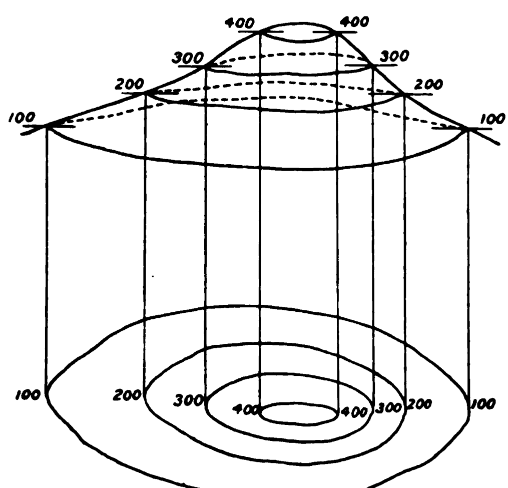


FIG. 1.—View of hill with contours supposed to be visibly marked. Plan of the same hill.

different specific levels; darker shades being employed to represent the higher elevations above sea-level. A key is generally attached to maps constructed on this principle, showing the significance of the various colour shades. The layer system is not usually employed in military maps in this country.

(3) *Contours.*—Contours are the lines on a map which represent the outline of a hill cut at various regular vertical intervals by imaginary horizontal planes. They may also be defined "as the plans of the lines at which a water surface (of the ocean, for instance) would intersect the surface of the earth were it raised successively by equal amounts."

The diagram fig. 1 (taken from the "Manual of Map Reading and Field Sketching") illustrates these definitions graphically. The upper part of the drawing represents a hill in elevation cut by contours at levels of 100 feet. The lower part shows how these contours would be represented in plan. It will be noticed that the contours are numbered, and the vertical distance between each section is 100 feet. The vertical difference of level (not the actual distance, as shown in plan) between two adjacent contours is called the *vertical interval*, or V. I. The vertical interval is always expressed in feet. The contours may be numbered or a note may be made on the map to show their significance; thus a note, "contours at 50 feet, V. I.," means that two successive contours are separated by a V. I. of 50 feet.

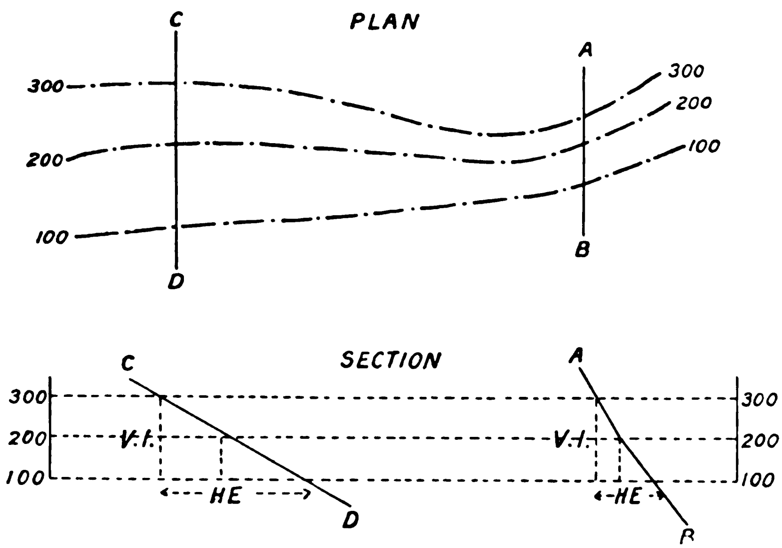


FIG. 2.

The distance on the map between two adjacent contours is called the *horizontal equivalent*, or H. E., and is usually expressed in yards. If the V. I. is fixed, it is obvious that the length of the H. E.

will vary according to the mean degree of slope. Thus if the slope is gentle, the H. E. will be long and the contours will be wider apart than they would be if the slope is steep. This will be recognized readily by a study of the preceding diagram :—

The ground is steeper at AB than at CD ; therefore the horizontal equivalent is shorter and the contours are shown nearer together at AB than at CD.

(i) When the contours are evenly spaced, the slope represented is uniform (fig. 3, A).

(ii.) When the contours are closer together towards the top of a hill, and further apart towards the bottom, the ground is concave, and the top and bottom of the hill are mutually visible (fig. 3, B).

(iii.) If the contours are further apart towards the top of a hill, and closer together towards the bottom, the ground is convex, and the top and bottom of the hill are as mutually invisible (fig. 3, C).

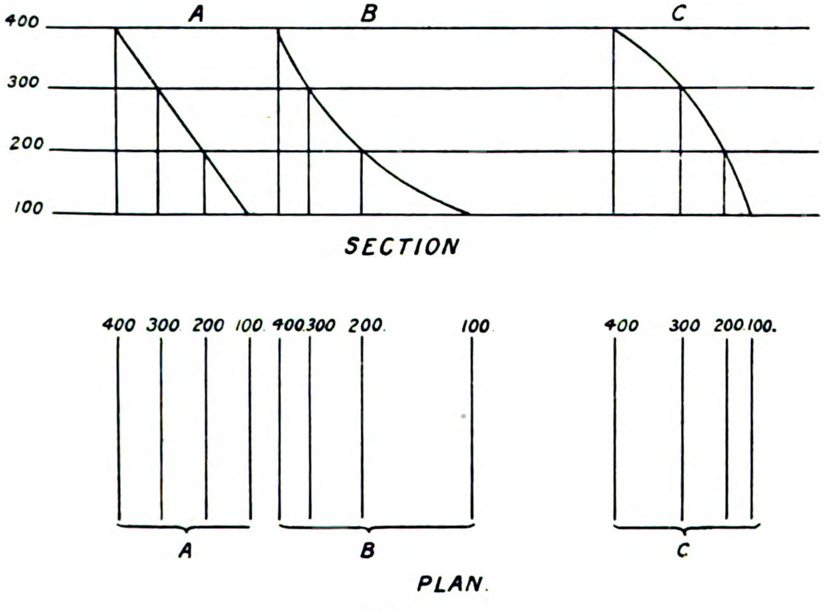


Fig. 3.

Precisely a similar arrangement of curved contours may represent either a spur or a valley. In maps in which hills are not indicated by distinctive shading, in addition to contours, it is necessary to note the numbering of successive contours, in order

to determine which of these features is portrayed. If the contours curve away from the higher ground, a spur is represented; if they curve towards the higher ground, a valley is indicated (fig. 4).

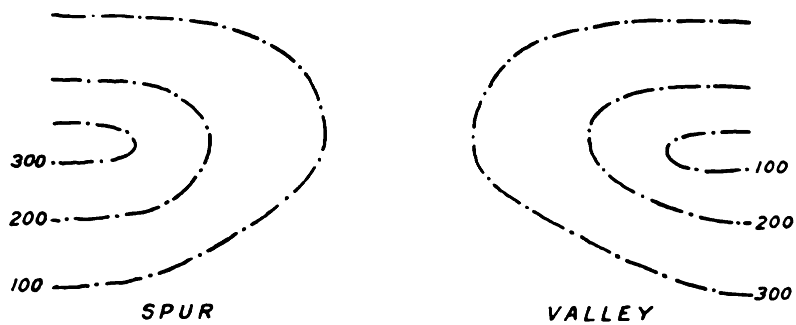


FIG. 4.

The following diagram (fig. 5) gives an idea as to how contours show the features of the ground :—

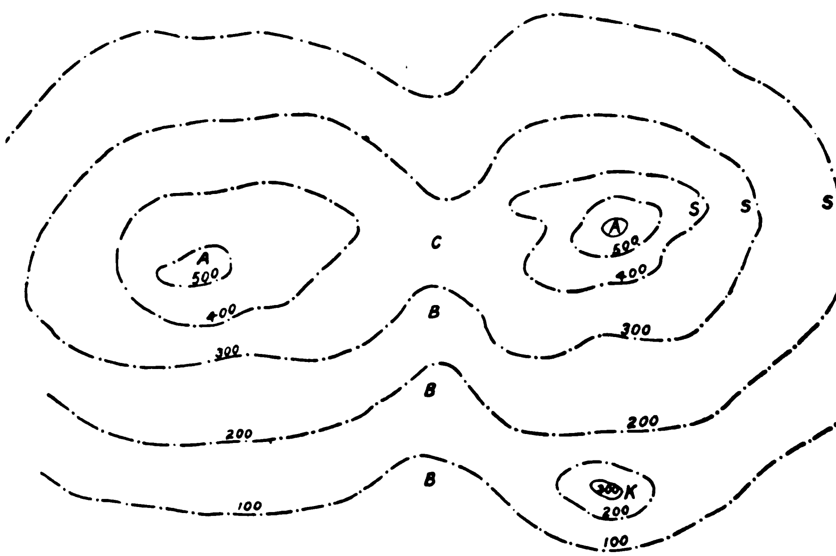


FIG. 5.

A and A are *hill tops,* because the numbering of the contours shows that they are higher ground, and the contours go right round them.

B B B is a *valley*, because the contours curve in towards the higher ground.

S S S is a *spur* or projection, because the contours curve out away from the higher ground.

C is a *col* or depression between two adjacent hills. (The word col is also applied to a break in a ridge, or to a neck of land which connects an outlying feature with a range of mountains or hills, or with a spur.)

K is a *knoll*, or low detached hill. It will be observed that the lowest contour on it indicates the same elevation as does the next contour towards the higher ground.

The general form of a slope may be told from a hachured and contoured map :—

(1) On broad lines by the contours. (Drawn at 100 feet V. I. in a 1-inch ordnance map.)

(2) The hachuring is darker where the slope is steeper, and lighter where it is more gradual.

(3) By heights definitely marked in figures (spot levels), by comparison of which slopes can be roughly estimated.

"Contours have the following advantages as a means of expressing hill features :—

"(1) They show the hill forms with exactness and not vaguely, as is the case with shading.

"(2) They require little artistic talent to draw.

"(3) They obscure detail less than other methods.

"(4) They can be reproduced by lithography in the field."

The making of accurately contoured maps, however, "involves great labour and, consequently, expense, explaining why only the best maps are contoured, and then only at a considerable interval of height. Faced with these advantages and disadvantages as regards contours, a kind of compromise is adopted for field sketching, and the method of showing hill features is by form lines."

"*Form Lines.*—These are *approximate* contours. Here we give up the *contour* idea of :—

"(i.) Fixing by *accurate* levelling the *exact* position of

"(ii.) A *large* number of points of the same level *close* together, and of

"(iii.) Carefully *surveying* them.

"We content ourselves with the *form-line* idea of

"(i.) Fixing with *less accurate* instruments or by the eye the approximate position of

"(ii.) A small number of levels of points at *considerable* distances apart, and of

"(iii.) Sketching them in as carefully as limited time permits. No pegs are used to mark the form lines themselves. Levels are taken of points of the detail sketched, and the position of the nearest form lines is put in by calculation and eye." ("Manual of Map Reading and Field Sketching.")

Visibility.

It is very important that one should be able to ascertain whether a man standing at a certain point could see (or be seen) from various points in the surrounding country, and also how far an area may be protected from the fire of an enemy holding certain definite positions. Such knowledge would obviously be an advantage in fixing sites for dressing stations and other advanced posts for the provision of medical assistance in the field.

The question of visibility depends principally on the formation of the ground, but partly on the presence or absence of certain natural or artificial objects, such as trees, hedges, walls, railway cuttings, &c., which might interfere with the line of sight. These objects may not be marked on a map, and an actual inspection of the ground may, in some cases, be necessary before a definite decision as to visibility can be arrived at. However, a great deal can be learned from the map, especially with regard to the question of protection from fire.

"It is obvious that, on an open plain which is perfectly flat, or on a slope which is absolutely uniform, not only will any two points be visible from each other, but the intervening country will be visible from either point."

"Plains, however, are seldom perfectly level, even if their surface presents a level appearance when viewed from a distance; they will usually be found, on closer inspection, to be broken by depressions and elevations quite sufficient to conceal bodies of troops."

"Similarly slopes are seldom uniform throughout; they are generally 'concave,' *i.e.*, steeper at the top than below, or 'convex,' *i.e.*, gentle at the top and steeper below." ("Notes on Map Reading for Use in Army Schools.")

It has already been pointed out (fig. 3) that the top and bottom of a concave slope are mutually visible, and that if the slope is convex men at the end points cannot see each other.

Two points on opposite sides of a valley will obviously be visible the one from the other if no higher ground intervenes.

"The extent to which visibility of one point from another, and

of the intervening ground, can be ascertained from a sketch or map depends upon the size of the V. I."

"If the V. I. is small, *e.g.*, 10 feet, the unrepresented ground features are small, and visibility can be determined with considerable accuracy; if the V. I. is large, *e.g.*, 50 or 25 feet, the unrepresented ground features are large, and include all elevations and depressions of less than 50 or 25 feet, as the case may be."

"Whenever the map has contours with a V. I. greater than 10 feet, as would be the case with maps issued for service in the field, it is well to regard as doubtful the visibility on the actual ground of two points from each other which seem to be mutually visible on the map, unless it is evident that the line of sight from one to the other passes the height of a V. I. above any intervening feature represented on the map, though visibility of a portion of the ground may be inferred."

Bearing in mind the above limitations, we shall now consider the question of determining from the map the visibility of two points, the one from the other when rising ground intervenes.

Drawing a *section to scale* of the ground between the two points would show whether the rise is sufficient to obstruct the line of sight, but this is a lengthy process and would seldom be resorted to on field service.

A rough *freehand section* would show what obstacle or obstacles would be likely to obstruct the view, but it could not be relied upon to settle doubtful questions of visibility.

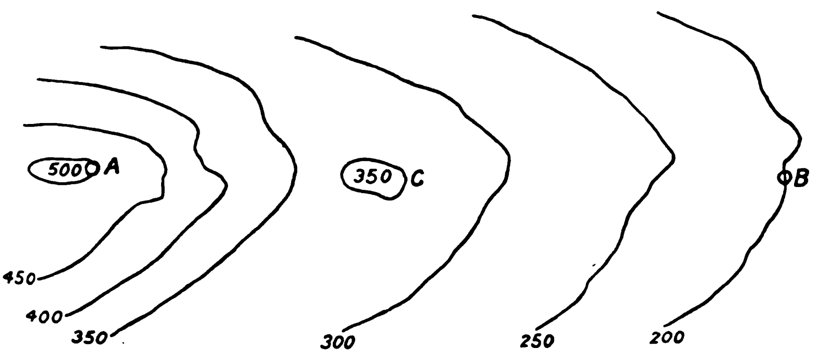


FIG. 6.

Very often questions of visibility can be decided by the eye, or by simple measurements, as is explained in fig. 6.

Supposing an observer at A wishes to know if he can see B, and supposing between the two there is a knoll (C), which appears as if it might obstruct the view. Then if the slope from A to C is flatter than the slope from C to B (B being the lower ground), the ground between A and B is convex, and therefore B cannot be seen from A. If the slope from A to C is steeper than the slope from C to B, the ground is concave and A can see B.

To read this from a map is a question of finding the average distance between contours per vertical interval of the difference of level between A and C and between C and B. Where the contours average further apart per vertical interval of difference of level, the ground is flatter, and where they average nearer together, it is steeper.

For instance, in fig. 6 the vertical intervals between A and C and between C and B are the same (150 feet). But it is obvious that the contours between A and C are, on an average, closer together than the contours between C and B. Therefore, the slope from A to C is the steeper, and B can be seen from A.

Another method of determining visibility is "by a proportion sum, taking the distances from the intervening feature to either point for the first pair of terms, and the difference in height between either point and the intervening feature as the third term."

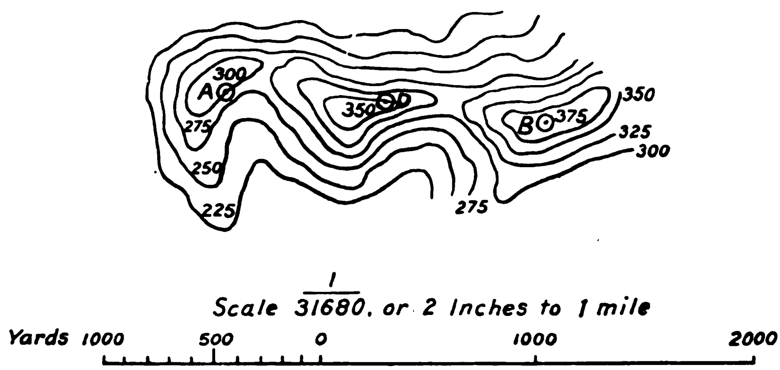


FIG. 7.

"Thus, in fig. 7, is the top of the hill B visible from the hill A? The hill D is the intervening feature. Distance from B to D, 820 yards; distance from D to A, 700 yards; difference in height, D and B, 25 feet.

"The line of sight from A to D rises 50 feet in 700 yards. The amount it will rise from D to B is found by proportion, as

follows: 700 yards : 820 yards : : 50 feet : x feet, whence $x = 58{\cdot}5$ feet.

"But B is only 25 feet above D, whence it is clear that the line of sight from A passes $58{\cdot}5 - 25 = 33{\cdot}5$ feet above B, and therefore B is invisible from A.

"When it is doubtful which of two or more points may obstruct the view, the visibility of these points must be tested, and the furthest point visible is the only one which can block the line of sight. Intermediate points may be ignored."

A slight dip in the ground may give cover from view, but not from fire. Owing to the flight of a bullet following a parabolic curve, bullets may, especially at long ranges, pass over a small elevation which intervenes and hit troops which are invisible to the firing line; and the danger area will be extensive if the reverse slope conforms with the fall of the trajectory. Then again, if the reverse slope of ground behind which troops are posted out of sight of a battery of artillery in action is less than the lower edge of the cone of dispersion of a bursting shrapnel shell, those troops may be swept by shrapnel bullets.

Slopes and Gradients.

The rate of ascent or descent of sloping ground may be expressed :—

(1) In *degrees*, which show the angle at which the sloping ground rises or falls from the horizontal.

(2) As a *gradient* or fraction, the enumerator of which is always one unit and the denominator any number of similar units. Thus a gradient of $\frac{1}{60}$ represents a rise or fall of 1 foot in 60 feet, and is usually spoken of as a gradient of 1 in 60.

When a road is said to have a *ruling gradient* of $\frac{1}{30}$, $\frac{1}{60}$, &c., it is indicated that no part of the road has a steeper slope than is expressed by that gradient.

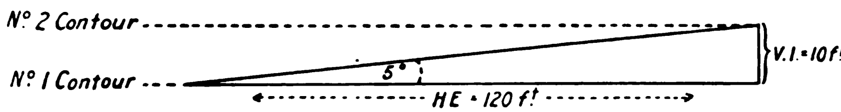


Fig. 8.

To Convert Slopes to Gradients and Vice Versâ.—A slope of 1° is actually equivalent to a gradient of 1 in 57·3, but may be taken for our purposes to represent a gradient of $\frac{1}{60}$. Then, by dividing 60 by the denominator of the gradient, we obtain the number of degrees of a slope, and conversely, by dividing 60 by the number of degrees of a slope, we get the denominator of

the gradient. Applying this rule, we find that a gradient of $\frac{1}{30}$ = roughly a slope of 2° (actually 1° 55′); and a slope of 5° = a gradient of $\frac{1}{12}$.

To find the denominator of the gradient of a regular slope between two points in a map: Divide the actual distance in *feet* between the points by the vertical interval of their difference of level, as ascertained from contours or spot levels. If it is wished to express the gradient as a fraction, the following formula may be used :—

$$\frac{\text{V. I.}}{\text{H. E. (in feet)}} = \text{Gradient.}$$

The following is a useful formula for ascertaining the difference of level between two points where the degree of slope between them is known :—

H. E. × D = V. I. × 19·1
D. = degree of slope
H. E. = horizontal equivalent in *yards*
V. I. = vertical interval in feet
57·3 ÷ 3 (*i.e.*, number of feet in 1 yard) = 19·1

Example : Find difference of level between A and B, B being the lower ground. Slope from A to B, 5° ; distance A to B, 1,000 yards :—

$$\frac{1000 \times 5}{19 \cdot 1} = \text{V. I.} = 261 \cdot 78$$

therefore, A is 261·78 feet above B.

Classification of Slopes.

Gentle up to	5°
Ordinary	5° to 15°
Steep	15° to 25°
Very steep when over	25°

Slopes of 5° form no obstacle whatever to movements of troops, but above 5° their influence commences to be felt.

Slopes of 10°.—Infantry have difficulty in moving in close formation; cavalry can only charge up-hill for a short distance; artillery moves with difficulty, and the fire is carried on under disadvantageous conditions.

Slopes of 15° are described as the *limit for manœuvre.* Infantry can only move a short distance in order; cavalry can only trot up a short distance and walk down; artillery moves with great difficulty, its fire ceases entirely.

Slopes of 20°.—Neither artillery nor cavalry can move in any order.

Slopes of 30°.—Impassable for infantry in close formation, and even single horsemen have a difficulty in moving.

Steeper slopes are only passable for infantry moving in extended order or climbing; but the practicability of slopes depends largely on the foothold, whether rough and rocky, or smooth and grassy. On a hot, dry, summer day, a grassy slope of even 15° is most difficult to ascend, while a much steeper slope, if rough, can be easily traversed by infantry. ("Notes on Maps and Map Reading," by Lieutenant-Colonel H. M. E. Brunker.)

Effects of Slopes on Wheeled Transport.—From experiment it has been shown that even at a moderate gradient, 1 in 24 (a slope of 2½°), a horse can only drag half as great a load as on the level; whilst at a slope of 1 in 10 (or 6°) it can only draw a quarter as much.

For military roads the gradient should rarely exceed 1 in 20. Such a gradient will retard the ordinary speed of a loaded wagon by one-half on a good road, and if the hill be more than 100 yards in length, the horses will require to stop for breath. Some horses can drag a load for a short distance up a gradient of 1 in 10.

Some country roads in England are as steep as 1 in 8, but in such places horses invariably "tack" up them if drawing a heavy load. For such gradients wagons, even on good or fair roads, should have extra teams; while it may be taken that heavy wagons cannot ascend a steeper gradient than 1 in 7 without extra horses. ("Notes on Maps and Map Reading," by Lieutenant-Colonel H. M. E. Brunker.)

Gradient of Camping Grounds.—If possible no camping ground should have a steeper gradient than 1 in 30. Even with this slope a man lying with his feet up the incline would have his head about 2 inches below them, and this would cause a certain amount of discomfort to many individuals.

Rough Method of Determining the Gradient of a Road.—Stoop or stand on tip-toe as required until the eye is 5 feet above the ground. Look along the road up-hill. Hold a short stick at arm's length with the upper edge on the level of the eye. Look along the upper edge and observe where the sight ray cuts the ground; call this point P. Pace the number of yards on to P. Then the road in front rises 5 feet in so many yards—5 feet in a certain number of feet. This will give a rise of 1 foot in so many feet, which is the gradient of the road. Say P is found to be 10 yards from the observer, then $\frac{5}{30} = \frac{1}{6}$ = gradient. ("Military Map Reading" simply explained by W. P. Lynam.)

(*To be continued.*)

MALARIA IN INDIA.

By Major J. B. ANDERSON.
Royal Army Medical Corps.

The disease that incapacitates more men by far than any other in India is the subject of this article. My primary object in writing is to show that there is for one and all only one way of combating this direful disease amongst British and other troops, and that is, by mechanical defence, by the institution and judicious use of mosquito nets. People at home, who naturally are not so interested as we are out here, cannot possibly realise the havoc wrought by this terrible scourge, and we are more than ever awakening to the fact. India recovers quickly from calamities, but the epidemic in 1908 will have a far-reaching effect in that many will be life-long sufferers from cachexia, enlarged spleens, and anæmia; malaria also causes a decrease in virility which will certainly be reflected in a diminished birth-rate during the succeeding years. The trooping season is on us, and as many medical officers will soon be arriving who possibly may never have seen the country and who have no idea of the consequences produced by this disease, perhaps a few statistics may awaken their interest. Nor shall I be digressing, as presently I shall want to refer to these figures:—

Approximate Strength of British Troops, 70,000.

Year	Admissions	Deaths of those admitted and invalided home	Number sent home as invalids	Numbers finally discharged the Service
1898	28,382	50	485	59
1899	16,579	36	246	34
1900	19,445	62	190	14
1901	18,217	35	418	18
1902	15,367	45	245	13
1903	17,037	35	244	23
1904	12,112	23	259	26
1905	7,947	10	126	10
1906	12,601	22	136	—
1907	10,662	15	274	2

The Sanitary Commissioner's report for 1908 has not yet been published, but there was a devastating epidemic during this year and the admission rate-amongst British troops, I understand, was the highest since 1903 and the death-rate the highest since 1902.

The above figures do not convey all the facts. Treatment in barracks was introduced in 1903. I regret I have no other figures, but in 1906 and 1907 there were 4,317 and 4,942 respectively so treated. These are not recorded as admissions, nor naturally are

the many men who do not report sick and who procure their quinine at post offices and other places. Attention should further be paid to the fact that the practice of returning only those cases in which the parasites are found in the blood is adopted in many stations which, unquestionably lowers the admission-rate. The periods 1903 to 1904 might almost be called "the transition period," as it was then the microscope came into general use and many cases in which the parasite was not found or the cyto-index taken were relegated to the nomenclature of "simple continued fever."

To give an approximate idea of the amount of sickness due to this disease in the Native army, I cannot do better than just mention that during the above decennial period there was an average annual admission-rate of 34,074 on the average annual strength, 124,523. Amongst the prisoners in civil jails, too, there were similarly no less than 39,540 admissions amongst an average jail population of 110,477.

It may be interesting to relate here, that outside India it is little known that there are approximately 4 to 5 million deaths a year from fever amongst the native population of India, and for reasons it is unnecessary to relate here it may be said 20 per cent. to 25 per cent. of these are due to malaria, which gives an annual death-rate of about 1,100,000. And as mortality in this disease is ordinarily low (about 5 per 1,000) the above figures indicate an amount of sickness which clearly calls for the best efforts to reduce it.

In the course of this paper I shall mention my views with regard to that most excellent prophylactic, quinine, and shall only touch on other anti-malarial measures as being subsidiary to nets and quinine. Enquiries, conferences, commissions and anti-mosquito measures, with their mosquito brigades of medical officers, trained soldiers, gangs of coolies and what not, will, without mosquito nets, go on for ever, and so will malaria. I wish to emphasise from the beginning that unless used with unremitting care and attention mosquito nets are worse than useless. More of this anon. I will now briefly consider the effect of measures for the reduction of mosquitoes, and cannot do better than quote some extracts bearing on the matter which I have taken from the annual reports of the Sanitary Commissioner with the Government of India:—

1901. Effect not very apparent at some stations. Kerosine produced no appreciable difference, perhaps because not carried out with great thoroughness. At a few stations stagnant pools, &c., were filled up and there was less malaria.

1902. Sanitary Commissioner states: "It would be unwise to attribute the decrease in malaria this year to such trifling measures as were carried out to destroy mosquitoes." And with reference to the Royal Society's Commissioners sent out to experiment on a large scale regarding the value of certain measures (*sic*), destruction of mosquito larvæ, &c., the Sanitary Commissioner concludes his report thus: "On the whole, therefore, it would appear that the results of the present experiment were distinctly against the employment of anti-mosquito measures as a practical means of combating malaria in such a cantonment as Mian Mir."

1903. Captain James, I.M.S., deputed by the Government of India to assist the Royal Society's Commission, considers that efforts directed only against breeding places in Delhi fort would be unsuccessful and outside the fort impracticable, and that mosquito nets would be the best practical means of combating malaria in this fort. The same officer states that other methods than anti-mosquito measures would be more successful at Meerut and that quinine and curtains constitute the best method of combating malaria at Allahabad Fort, and that anti-mosquito measures at Fatehgarh would be useless.

1904. Measures to diminish mosquitoes were pursued with more thoroughness. Medical Officers have become more cognisant of the difficulty attending mosquito destruction, and the reduction in admissions this year was due more to other measures than to the destruction of mosquitoes.

1905. A year of abnormally small rainfall with exceptionally little malaria. Anti-mosquito measures were carried on enthusiastically and methodically, with good results, but in some stations such measures were regarded as impracticable and in others futile.

1906. Malarial fever very prevalent and a great rise in admissions compared with those in the previous year. Mosquito brigades were organised in nearly all stations in the plains, and carried on a systematic campaign throughout the year.

In a few stations the effect was reported to have been fairly successful, but in the great majority little or no effect was produced.

1907 Operations for the destruction of mosquitoes were carried out as usual in nearly all stations on the plains.

1908. Not yet published.

So that, on the whole, even the greatest advocates of mosquito reduction will see, that although such measures in some stations do good, there may be others in which it is useless to try and carry them out to any great extent.

To return now to the most important question of mosquito nets. When it is known that the Anopheles mosquito sucks the blood of a malaria-infected person, and transfers the parasite to a second person, and that this is the one and only way, so far as we know, by which malaria is produced and spread, surely it stands to reason that if we can prevent this sucking we can prevent malaria, and the most practical way of doing this is by the aid of mosquito curtains.

Let us see what objections can be raised to bringing them into general use. Can disapproval be founded on the score of expense? If only to raise the question let us get an idea of what the disease at present costs the State. Firstly, what does it cost to replace an European soldier who dies in India? Some say £100, others £300. I should have thought the thoroughly well-trained, efficient, and acclimatised soldier, say of five years' service, considering the cost of clothes, food and other necessaries of life, his passage out, the pay and upkeep of the officers who train him, all of which must be taken into consideration, would have cost the State at least £200 or £300. However, let us assume, say, £150; only let it be remembered his substitute is invariably an unacclimatised, undeveloped, more or less raw recruit. The deaths alone then during the quinquennium ending 1907 were 105 and will have cost the State £15,750. Assume now the average life of a mosquito net to be five years—they are in use only a few months in each year. To supply 70,000 troops at 6 rupees per head would cost £28,000.[1] Consider now the 60,359 admissions, the 1,000 odd invalids sent home, and the sixty odd discharged the service as unfit during these five years. I will leave others to work out the figures, my present object being only to show that should mosquito nets prove effectual in preventing malaria the free issue of them would cost the State nothing. I would go further and assert they would be an asset to the State and to the army about to take the field. So that I think we can dismiss any objection on account of expense. It might be said some regiments are already infected, having arrived from Egypt or elsewhere. In the course of time they would not be, as the protective measures would apply to all mosquito-infected countries.

[1] If double rows of metal piping were permanently fixed lengthwise into the walls of all barrack-rooms, mosquito poles would be unnecessary.

The question might arise as to how units are going to dispose of their nets on leaving a country. I should say, hand them over to their reliefs, and if, for instance, they have been in use for three years the latter must make further use of them for two more years. Nets encounter the opposition of some on account of the alleged defective perflation of air their use involves. This is true, but only to the extent that one would not feel quite so much the cooling effect of any slight breeze.

The Sanitary Commissioner with the Government of India in his annual report for 1907 says: "When it is stated that soldiers in stations with climates so widely different as those of Peshawar, Delhi, Agra, Dum Dum, Colaba, Bhamo, and Rangoon willingly and intelligently used the mosquito curtains provided for them, and that many soldiers in these and other stations purchased curtains at their own expense, it will be appreciated that there can be few, if any, stations in India where the heat is such that soldiers would object to use nets."

The malarious months of the year are not, in India, by any means the hottest months; there are exceptions, of course, but as a rule the nights are cool and the nets can be used without discomfort, so I think we may dismiss any objection to mosquito nets on account of heat. Barrack-room punkahs do not afford sufficient protection against mosquitoes; moreover, their use has often to be discontinued on account of the cold before the malarious season is over, as at Rawal Pindi and Peshawar. Another possible objection, and that is a man might get bitten previously to going to bed. As a matter of fact, he is not nearly so likely to be as when lying in bed with his body practically exposed. When up and about he is clothed in khaki, he has thick socks and boots on, his faculties are all alert, and he usually resents any irritation.

One or two regiments, I believe, have been supplied with mosquito nets, but the test of their efficacy has hardly been a fair one. Many men were probably already infected, and it only required some depressing influence without any fresh infection to bring on a relapse, which is apt to occur unless there has been a permanent cure, which I shall touch on presently.

Having now disposed of the main objections, let us assume mosquito curtains are indispensable.

The next and important question arises as to what steps should be taken to bring them into general use. Personally I think at first they should be brought in gradually, as if done wholesale there are bound to be failures which would go far to bias others against adopting them.

I should demonstrate their success and let the results be widely known. I should commence with one regiment fresh from England or other mosquito-free country and send it to a well-known malarious station. I would attach an experienced medical officer to it, familiar with the microscope and tropical fevers.

A few lectures on malaria, and practical demonstrations as to how to use a net, should be given on the voyage out. On disembarking each man should be served with a net. He should keep it up, it should form part of his bedding during the malarious months of the year, he should be taught how to repair it, how to take care of it, and above all he should be carefully watched as to how he uses it, for upon this latter completely depends success or otherwise. The duties in connection with this would no doubt at the beginning be a little irksome, as early in the afternoons, before the mosquitoes bestir themselves, inspection would have to be made to see that the curtains had not a single, even minute hole; they should hang inside the poles, if used, and be tucked in under the mattress, and should not trail on the ground. A piece of closely woven material fastened on all round at the level of the body is a necessary addition, especially as the soldier's bed is a narrow one, in order to protect the limbs during sleep from bites through the net. Further inspections would be necessary after the men had turned in, to again see that there were no inlets. If a man waits to lower his net until going to bed there is always the risk, especially in barracks where the light is not too good, of enclosing a mosquito or two, as they are then difficult to see. Considerable care and thoughtfulness must be given. These, which might appear unnecessary precautions, are most important, and without their strict observance efforts are bound to prove futile. The above inspections would have to be continued, until it is seen that the men are thoroughly acquainted with their nets and understand the reasons for all the precautions taken, when efforts could be gradually relaxed. It is no more impracticable to teach a man to look after his mosquito net than it is to look after his rifle, and just as it is considered a crime to neglect the latter so also should it be to neglect the former. Stephens and Christopher in their summary of "Researches on Malarial Prophylaxis" state that among all the precautions taken against contracting malaria the mosquito net is far and away the greatest means of individual protection. Captain James, I.M.S., in his excellent little book on malarial fevers, which I advise all new-comers to get, states that considering the large sums of money allotted annually for expenditure on the

care and comfort of the European soldier in India, it is especially surprising that he has not yet been provided with a mosquito curtain, and at the Bombay Medical Congress, as far as I can remember, a more or less similar statement was made. Practically every officer has a mosquito net. I have not the slightest doubt that some day mosquito nets for men will be an accomplished fact. But why procrastinate?

With regard now to the prophylactic, quinine. By prophylaxis I mean disinfection of the infected, or, what is the same thing, prophylaxis against relapses in the already infected. I consider that with mosquito nets quinine is not only unnecessary for the healthy, but there are reasonable objections to administering it to them. For what is quinine therapeutically? Idiosyncrasy and susceptibility play their part. In, say, 15 to 40-grain doses it is well known to produce depression and gastro-intestinal irritation. It paralyses the white cells, and by binding the oxygen firmly to the red cells these latter are unable to give up or absorb so readily the oxygen necessary for health, consequently the tissues suffer. The heart, circulation, and nervous system are depressed by large doses which are apt to produce a train of symptoms termed cinchonism. The utility of quinine in arresting malarial fever is due to its acting as a poison to the plasmodium, and its action on crescent forms and flagellated bodies, which form the type of about 20 per cent. of the cases of malaria, is very uncertain; therefore, I ask, why saturate a man's tissues with this drug when he is perfectly healthy, and can invariably be kept so with the aid of a mosquito curtain? A further objection to its wholesale use is, that the demonstration by the microscope of the malarial parasite in cases of ague becomes proportionately more difficult.

On the other hand, owing to its powerful destructive effect on malarial parasites, no one can help being an advocate of quinine for the sick, only I do consider that when this drug is administered it ought to be done so scientifically. Space does not permit of my going deeply into the matter, and I am aware the actual plan of treatment, especially the after-treatment, is a very debated point. So I will content myself with a few remarks, and follow them by a method of treatment, which, if not practicable, will possibly give the cue for a more acceptable and perhaps better one—but in doing so I am considering more especially the patient who, although in possession of a net, happens perchance to get infected, so that he may be taken in hand immediately and cured, in order to render him once more immune.

Before administering quinine it is first necessary to form the diagnosis and to be careful to exclude such slight fevers as are due to exposure to sun, over-fatigue, biliousness, and chill, which are common in this country. Here the microscope will be of much assistance, either in finding the parasite or in noticing an increase in the relative number of large mononuclears which seem characteristic of most protozoal blood infections. When the diagnosis is confirmed I would have a malarial case-sheet much in the same manner as a man suffering from syphilis has a syphilitic sheet. By such means no man on transfer could escape his treatment, and he would be less likely to convey infection. I attach the case-sheet (filled in) I would propose, and it explains itself.

The maximum and initial single dose of quinine I put at 15 grains. This amount is sufficient for all purposes, and to the less tolerant it is useless going on with 10 or 15 grains. In these cases the dose should be diminished or else euquinine or injections tried.

In pernicious cases injections can be given along with the routine treatment, but they are best given intra-muscularly. Quinine given this way is absorbed slowly, and can be given in large doses, but 8 grains of the bihydrochlorate is an average dose. It is hardly necessary to state that quinine is best given before breakfast, as absorption is most active in the mornings, and if it is going to do good at all it will do so rapidly. In fact, one may say, if after five days the fever still continues the case is either not malaria or else the quinine is passing through the intestine without being absorbed. Phenacetin is best avoided, as it is a depressant and has no action on the parasites, and by lowering the temperature is apt to give the false impression of having cured the patient. And, finally, I might mention that although quinine easily kills the asexual forms it is practically inoperative on the sexual forms. These latter gradually disappear of themselves, for which we arbitrarily allow three months, and it is during this period that we attack the asexual parasites of the sexual forms that result from parthenogenesis, and so stop relapses from which the patient is bound to suffer.

There are at present in this country thousands of troops infected, and as soon as these are rendered immune or their place is taken by fresh troops from home, I am convinced that if nets are properly used, and if the few sporadic cases which one is bound to get now and then are treated in the way I have mentioned, malaria in regiments should become practically a negligible quantity.

MALARIAL CASE-SHEET.

(To accompany a soldier on leaving his station, if under treatment.)

Station Bareilly

No. 2543 *Rank* Private *Name* F. P. *Regiment* 1st Middlesex

First attack or No. of relapse } 2nd Relapse *Nature of Parasite* } B. T.

Notes by Medical Officer.—Parasites found. No crescents, but owing to his medical history sheet showing he suffered from malignant tertian four months ago, intra-muscular injections of bihydrochlorate of quinine, 8 grains, are being given after each interval in addition.

Date	Dose. Quinine in grains	
In	*patient*	Average routine, which will vary according to circumstances :—
8th April, 1909	30	One dose of quinine sulphate, 15 grains, followed by 3 drachms of an acid draught.
9th ,, ,,	30	Two doses daily for 5 consecutive days in hospital.
10th ,, ,,	30	
11th ,, ,,	30	
12th ,, ,,	30	Discharged hospital.
Out	*patient*	
Interval 8 days		Interval of 8 days.
21st April, 1909	15	
22nd ,, ,,	15	To attend on 3 consecutive days for one dose daily.
23rd ,, ,,	15	
Interval 8 days.		The interval alternating with 3 days, attendance to be continued for 3 months from admission.
2nd May, 1909	15	
3rd ,, ,,	15	
4th ,, ,,	15	
Interval 8 days.		Should a relapse occur, the whole treatment must be commenced over again.
13th May, 1909	15	
14th ,, ,,	15	
15th ,, ,,	15	
Interval 8 days.		
24th May, 1909	15	
25th ,, ,,	15	
26th ,, ,,	15	
Interval 8 days.		
4th June, 1909	15	
5th ,, ,,	15	
6th ,, ,,	15	
Interval 8 days.		
15th June, 1909	15	
16th ,, ,,	15	
17th ,, ,,	15	
Interval 8 days.		
26th June, 1909	15	
27th ,, ,,	15	
28th ,, ,,	15	
Interval 8 days.		
7th July, 1909	15	
8th ,, ,,	15	
9th ,, ,,	15	

COURSE COMPLETED.

R. S. S., Major R.A.M.C.
Signature of Medical Officer.

BOOTS.

By Captain R. H. BRIDGES.
Royal Army Medical Corps.

In writing on the subject of boots, I do not think it is necessary to make any apology, as the importance of the subject is so great from a military and hygienic point of view. All great commanders have been fully aware of the importance of the soldiers' footwear. Napoleon remarked that he made war not so much with the arms of his men as with their legs. Marshall Neil considered good shoes for his infantry as important as good mounts for his cavalry; while Wellington, when asked to enumerate the three most essential parts of the soldiers' equipment, replied, firstly, a pair of good shoes; secondly, another pair of good shoes; and, thirdly, a pair of spare soles. No one appreciates more than the medical officer the dreadful hardships caused in all wars by defective boots; these hardships are either due to initial defects in the structure of the boots or to their being worn out and it being impossible to repair them or to provide the soldier with new ones.

In the "Life of Sir John Moore" (recently published) a most pathetic picture is given of the sufferings of the men in the retreat to Corunna, due to the soles of the boots being worn through. The line of march was marked by men who had fallen out with bleeding feet and found it impossible to go on. Over 30,000 Germans were incapacitated for duty during the first few weeks of the Franco-German War on account of injuries to the feet, the greater number of these being due to the issue of footwear hardened by long storage in the depôts.

Leques in 1882 found that excoriation of the feet figured as no less than 33 per cent. of all cases of exemption from active service amongst young French soldiers during a campaign.

The troubles arising from these causes during the South African campaign are too well known to require comment.

In a recent campaign in India a well-known regiment was unable to take part in the operations owing to the condition of the men's boots. Let us consider for a moment the "ideal boot."

The sole should conform in shape to the natural outline of the foot, which is a long curve on the outside, while the inner side approaches a straight line. Ample space for the little toe should always be provided. The toe of the boot should be slightly rounded, the point being towards the curved aspect rather than the centre,

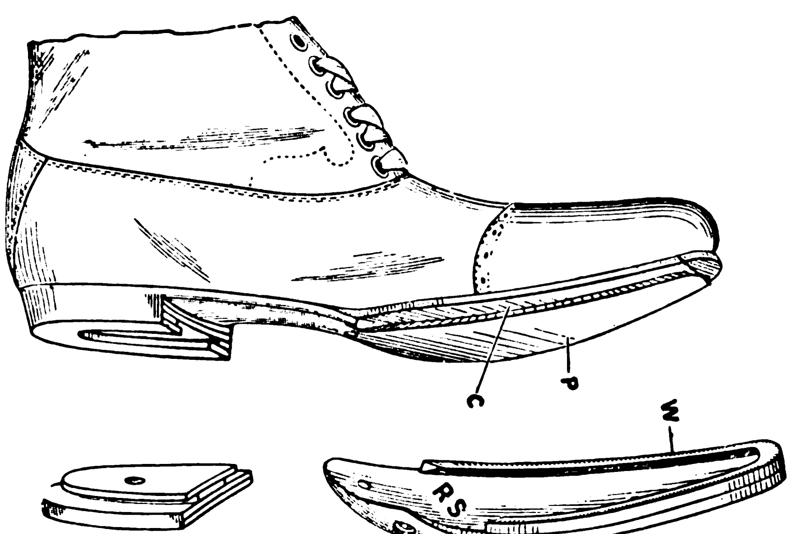
but no great breadth is necessary at the middle of the foot—*i.e.*, the waist of the boot—as this part does not spread to any extent. To protect the foot against stones, the sole should be wider than the upper by about one-eighth of an inch, but, if it projects too far, it tends to accumulate mud. The sole should be supple, since if it is too thick flexibility is lacking; whilst if too thin, the protection is insufficient and the boot lacks solidity. The insole should be slightly concave to receive the heel and ball of the foot, but there should be no interference with the free play of the ankle. One of the mistakes in the present Army boot is that the uppers are very thick and stiff, consequently men often complain of pain on the inner side of the ankle; this is provided for in certain foreign army boots by a piece of soft leather being let in over this part.

Care must also be taken that the uppers are not too low, as otherwise the putties are apt to ride up over the boots.

I am certain that not nearly enough importance is attached to the heel. It is to a boot what the foundations are to a building. It is essential that the heel should rest evenly upon the ground, as otherwise the whole boot is distorted and presses unevenly upon the foot, and the friction caused thereby is a fruitful source of corns and other troubles. If we consider for a moment the anatomy of the foot, we know that the weight of the body falls in the centre of the arch and is evenly distributed; but if the foot is placed unevenly on the ground, the body-weight must fall more on one part than another, and a tendency is at once set up to twist the component parts and to shift them from their proper positions. I am convinced that drilling and marching with boots in which the heels are badly worn down, especially if worn down at the sides, as is the case in more than 75 per cent. of the boots I have examined, is the starting-point of many foot troubles; and I think more attention should be paid to this point, especially as at the present day the soldier has to pay for his own soling and heeling and consequently wears his boots as long as possible before having them renewed. The best time to issue boots is when the men return to barracks after a march. One of the best methods I know of breaking in a new pair of boots is as follows:—

Soak the boot in water until every part is pliable, don while wet over a thick pair of socks and use them for a walk of several hours; they will then have acquired the exact shape of the foot at the end of the walk. The boot should then be removed, tightly packed with dry oats, and placed in a cool place in order to dry gradually. The outside should be given a coat of cod-liver oil, which should be

repeated several times at frequent intervals. The oats are shaken out and the boots will be found comfortable, as the oats have prevented shrinking, and no last can mould the inside of the boot as well as the foot itself. The great difficulty on a campaign is that it is impossible with the present boot to resole and heel it on active service. A man has boots which by long use have been rendered comfortable. The soles, however, are worn out. There is difficulty in repairing them on a campaign, and he knows that even if he is lucky enough to obtain a new pair of boots that he will have to go all through the trouble and discomfort of breaking them in. Recently a boot has been brought to my notice which appears to obviate these difficulties and enables a soldier to resole and heel his own boots.



The ordinary boot consists of three soles; this boot has four. The outer and middle soles are constructed of compressed and specially treated leather. In the accompanying diagram the specially treated middle sole, marked P, is seen (this sole corresponds to the outer sole of an ordinary boot). C is the channel in which the welt, W, of the removable sole slides. R S is the removable sole.

The inner sole is treated by a mechanico-chemical process which renders it absolutely and permanently waterproof, and prevents all alteration in shape. It is quite pliable.

The heels are also interchangeable and are constructed of two

stout layers (the wearing surface of the ordinary heel consists of one layer of leather) of specially treated leather, compressed at a pressure of 10,000 lb. to the square inch.

When we consider the large number of people who wear their heels down unevenly, the advantage of being able to shift them from one boot to the other, so as to ensure their being worn down evenly, is obvious. The uppers of these boots are also treated by a special process, which makes them extraordinarily soft and flexible, and also absolutely waterproof, and what is still more remarkable, no amount of soaking in water makes them lose their flexibility on subsequent drying, even before a fire. The advantages of this boot from a Service point of view are tremendous. In the first place, the actual weight of the boot is much the same as that of the present Army boot, and the fact that twenty-eight soles and heels can be packed in the space required for one pair of Army boots makes an enormous reduction both in space and weight in transport, the actual reduction in weight being no less than 700 per cent., incredible though this may sound. We all know that a boot is never the same after resoling, as this proceeding not only makes the boot tighter but also injures the welt and uppers.

In this particular boot no amount of resoling will injure it, as no stitching whatever is required. All that is necessary is a small screwdriver and two small screws. The soldier then removes the old sole and heel and slips a new one on, the whole proceeding only taking a couple of minutes, at the end of this time he has the equivalent of a new pair of boots, but with the advantage of retaining the comfort of an old pair, as no alteration in shape has taken place. Every soldier can also carry a spare pair of soles and heels in his pocket.

United Services Medical Society.

THERE was a demonstration of cases in the Royal Army Medical College, on November 10, 1909.

Captain KENNEDY described

A CASE OF PHAGEDÆNIC ULCERATION OF THE LARYNX,

This had a fatal termination. The disease had been contracted in Madras and was thought to be kala-azar. It was characterised by high fever and enlargement of the liver and the spleen, and nothing pointing to an affection of the larynx had been noted till a few days before death. It ran a course of nearly two years and at times the symptoms disappeared only to recur again. Finally the patient fell into a septic condition and died from exhaustion. The leucocyte count fell to between 3,000 and 4,000. No parasites were present in the blood or in the smears made from liver puncture, but there was marked polychromatophilia and vacuolation of the mononuclears.

The phagedænic ulcers were situated on the epiglottis and the left vocal cord.

(1) The soft parts of the tip and edges of the epiglottis were eroded, leaving about $\frac{1}{8}$ inch of bare necrosed cartilage exposed. The edges of the soft parts were smooth, slightly swollen and everted.

(2) A dark grey fungating slough arose from the region of the left vocal cord and ventricle and protruded into the larynx. When this mass of necrosed tissue was removed the ulcer was seen to have extended deeply into the soft parts and was beginning to attack the cricoid cartilage.

Smears from these ulcers showed numerous spirilli and *Bacillus fusiformis*, and crowds of other saprophytes.

Sections showed the presence of numbers of a large bacillus invading the tissues at the base of the ulcers. It was stained best by the silver method and did not retain Gram's stain. It had square ends and lay in chains in parallel rows. It was possible that this bacillus was the cause of the disease, but at the same time the probability that it was merely a saprophyte could not be overlooked. Cultures of the various organs gave no assistance in diagnosis.

The question of diagnosis was discussed and also the probability of the disease being the same as that described by Leys as ulcerous rhino-pharyngitis and quoted in Manson's book. The similarity of the symptoms with those in cases of sloughing phagedæna of the Tropics was pointed out.

A curious body discovered in the blood and still undiagnosed was shown.

The paper was illustrated with drawings and photomicrographs, as well as the specimens themselves.

Captain C. C. CUMMING showed

A CASE OF HEATSTROKE (SERJEANT M.).

On the afternoon of July 6th, 1908, at Campbellpore, Punjaub, India, this Serjeant felt he had a touch of fever. While walking over to hospital for a dose of quinine, he fell down unconscious and remained so for thirty-six hours; he had very high fever on admission and was delirious for a fortnight afterwards; when he recovered consciousness, it was found that he could not speak distinctly and could not make anyone understand him, he was unable to walk or to use his arms, and he could not feed himself; but he had no dysphagia, he was able to whistle, he retained control of his rectum, but he had retention of urine for the first week of his illness, after that he recovered complete control.

He was sent to the hills for three months, and whilst there his speech improved, but he remained unable to walk. He was invalided home in January, 1909. He arrived at Millbank on March 4th, 1909. Steady improvement had been made, he was able to use his hands, he could walk with the aid of an apparatus on which he rested his hands and steadied himself, his general condition was good. His heart, lungs and digestive system were normal, there was no headache, sensation was unimpaired, there was no hyperæsthesia, and sensation to heat and cold was normal, the facial muscles showed no paralysis, he could wrinkle his brow, shut his eyes tightly, blow out his cheeks and whistle. The tongue was protruded readily and did not deviate from the middle line, his speech could be understood, it was slow and deliberate, and he was evidently making an effort to articulate as well as possible, the words were slurred to some extent, there was some difficulty in starting a sentence and more muscles were brought into play than were necessary. The eyes reacted normally to light and accommodation. The epigastric and cremasteric reflexes were normal, but the plantar reflex showed Babinski's sign, there being very

marked extension of the great toe with "fanning" of the other toes. Of the deep reflexes, the triceps-jerk was difficult to elicit, the wrist-jerk was not observed, the knee-jerk was unduly active, but ankle clonus was absent. Swallowing was normal, and the bladder and rectum were under perfect control.

His present condition is as follows: General condition is good. His speech is rather difficult to understand, and this seems to be due to inco-ordination of the muscles of the tongue. The muscular power of the hands and arms is good but there is inco-ordination to a slight amount in the hands and arms, as shown when he tries to touch his nose with his eyes shut. Walking is difficult for him as he cannot maintain his balance without some slight support, but he manages to get along well in the walking machine and with his crutches, when he has an orderly beside him. When he is lying in bed and is asked to move his feet into any particular position, it is seen that there is considerable inco-ordination in his legs, but the muscular power is quite good. The knee-jerks are active and the plantar reflex gives Babinski's sign; there is no ankle clonus. Sensation to touch and pain are normal. The pupils react normally to light and accommodation, his eyesight is good. There is no loss of memory or deficiency of brain power, he is irritable at times. His hand-writing is improving but is still angular. The electrical reactions are normal.

The treatment has been massage, high-frequency currents, electric light baths, and re-education of his legs and arms to perform their proper functions.

Major W. S. HARRISON remarked that this case was an extreme example of the possible after-effects of heatstroke, and showed that it was not always perfectly recovered from as was sometimes stated. In his present condition the patient showed many resemblances to a case of disseminated sclerosis, but he differed very markedly in the fact that he was improving steadily, it was probable that what lesions there were resembled those of disseminated sclerosis in its distribution. One very interesting observation was that at the beginning of his illness, although the patient was quite unable to make himself understood, he himself thought that he was talking in his ordinary manner; and even now, he tells us, although his speech is slurred and deliberate, he would not know that he was talking in other than his natural fashion if he had not been told that his speech was altered.

Captain C. C. Cumming showed

A Case of Splenic Anæmia (Pensioner, H.).

This man contracted enteric fever in the beginning of 1902, in South Africa, and was invalided home afterwards; whilst on furlough he began to suffer from attacks of fainting and giddiness, and he noticed that his abdomen was enlarged; on return from furlough, he was found "permanently" unfit and invalided out of the Service. Later on, in the same year, he suddenly vomited a large quantity of blood and became unconscious, and his spleen was found to be enlarged. He gradually recovered from this attack and the spleen diminished in size, but in the middle of 1903 he had a similar attack with vomiting of blood and enlargement of the spleen. He remained practically free of symptoms after this till July, 1907, when he had a severe relapse which kept him in bed for six months. After a short interval of relief, this was followed by another hæmorrhage in February, 1908, and he was confined to bed until his admission to the Queen Alexandra Military Hospital on July 12th, 1908. He was then extremely anæmic, the skin being of a light yellow colour; over his chest were a number of scars which he says date back to the time when he had enteric fever, the abdomen was distended and shiny, but showed no enlargement of the superficial veins, there was marked tenderness over the right hypochondrium and in the epigastric region, and the edge of the spleen could be felt 4 inches below the costal margin in the nipple line, the liver could not be felt, the heart was enlarged, and a loud blowing murmur could be heard at the apex and over the pulmonary area, there was a well-marked venous hum over the right jugular vein, diminished resonance and vocal fremitus and moist râles were present at the bases of the lung behind, there was a frequent cough and dark brown muco-purulent expectoration. The blood count showed: red blood corpuscles, 1,408,000; white blood corpuscles, 8,114; polynuclears, 70·8 per cent.; large mononuclear, 7·5 per cent.; lymphocytes, 14·6 per cent.; eosinophiles, 2·7 per cent.; transitionals, 4·3 per cent. The urine contained a slight amount of albumin. His temperature was irregular, fluctuating between normal and 100·2° F., and there was marked constipation.

Treatment was commenced with minced meat and bone-marrow, and a mixture containing iron and arsenic. On July 19th, 1908 the arsenic was increased, and he was put on adrenalin $\frac{1}{130}$ grain thrice daily. On July 25th, 1908, the arsenic was stopped, and he was given soamin injections in 1-grain doses, increasing by 1 grain

every second day till August 3rd, 1908. At that time the œdema of the legs had gone, there was tenderness over the liver and spleen, the temperature varied between normal and 100·6° F., and the blood picture remained about the same.

On August 17th X-ray treatment was commenced with a daily exposure of seven and a half minutes over the splenic region, this was afterwards increased to ten minutes over the spleen, and for five minutes over the liver. On October 1st an X-ray dermitis appeared when the treatment was stopped; it had had no apparent effect in diminishing the size of the spleen. At the end of December an attack of pleurisy supervened, but this passed off in about a week. He continued fairly well until April 4th, when he had a very severe attack of hæmatemesis, which lasted on and off for twenty-four hours, and he became comatose and remained so for four days. This was followed by another small hæmorrhage on April 20th. After that he gradually improved, and has remained in practically the same condition as he is at present.

Present condition: He is very anæmic with a faint yellowish tinge in the skin, the abdomen is much distended with fluid, the spleen is enlarged to within 1 inch of the umbilicus, it is very hard and is tender, especially in the axillary line, the liver is not appreciably enlarged. The urine is normal.

Examination of the blood shows diminution of the red cells to three millions, the hæmoglobin is reduced to 50 per cent., and there is a diminution of the white cells with a relative lymphocytosis, but no abnormal forms of white or red cells can be found.

Major W. S. HARRISON remarked that this case was a good example of the fact that although a man had served in the Tropics, and showed the enlarged spleen which was so common there, it did not at all follow that he was suffering from a tropical disease. The diagnosis was now fairly clear; the very hard fibrous spleen, the ascites, and the hæmatemesis, with no very special alterations in the blood picture beyond those of anæmia, were characteristic of the so-called Banti's disease, even though one could not discover any diminution in the size of the liver. The blood picture excluded the more usual leukæmias. If one had seen the case in the earlier days one must have thought of kala-azar and malaria, but the absence of parasites from the blood would serve to exclude the latter, and the earliest record there is of the blood count shows none of the leukopenia which is so marked, as a rule, in kala-azar.

Major C. G. Spencer described

THE CASE OF NO. 5,409 (DR. C., 2ND SCOTS GUARDS).

Patient was transferred from Windsor on October 12th. The history was that on October 6th he was doing a "dive" over the horse in the gymnasium when his head came in contact with the mat on the far side and was forcibly flexed on his chest.

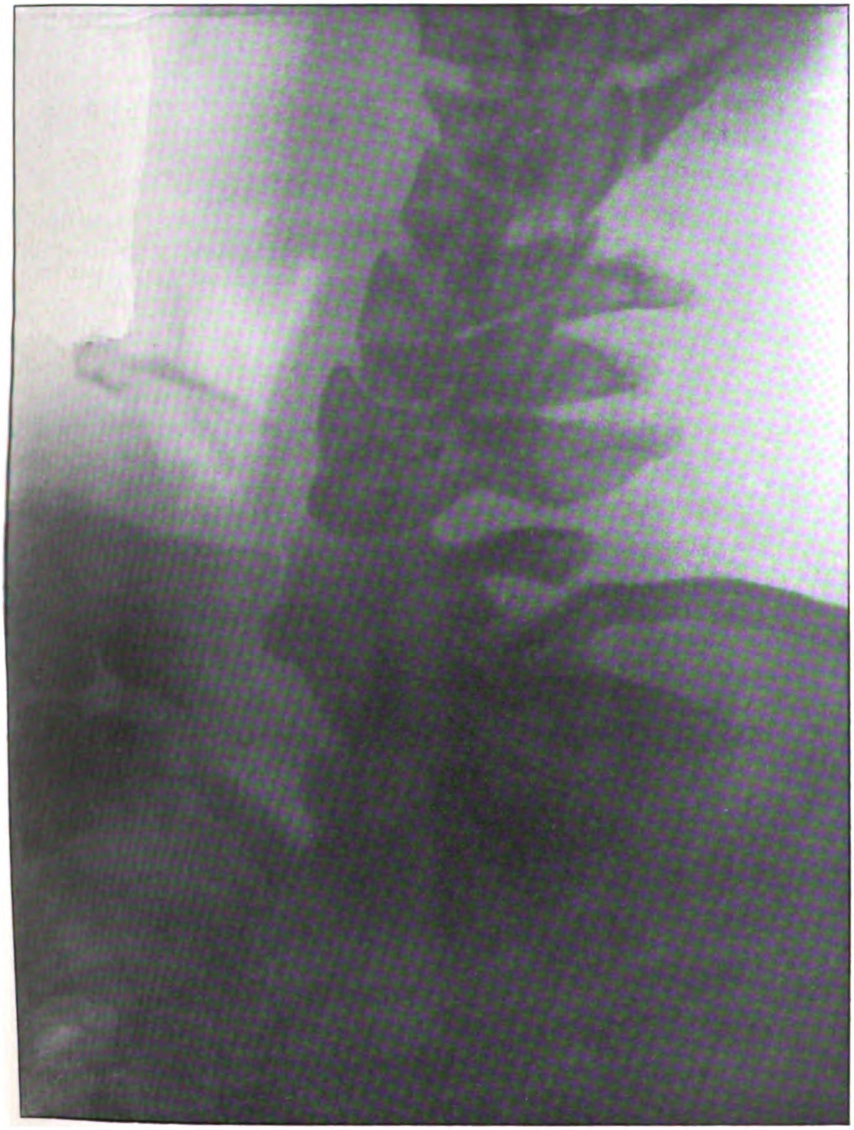
He was dazed, but quickly picked himself up, and later in the day he walked to hospital and was admitted. The following morning his neck was still stiff and painful and there was some numbness in his right hand. These symptoms had almost subsided on transfer to Millbank.

On October 12th there was rigidity in the cervical region, but no tenderness or deformity could be detected. Four days later an X-ray photograph was taken, which showed a fracture of the fourth and fifth cervical vertebræ. At the present time there is still some rigidity of the neck, but no deformity. There is also an area of impaired sensation over the posterior surface of the lower part of the forearm.

Fleet-Surgeon Thorpe mentioned the case of a man who suffered from fracture of the cervical vertebræ and had the operation of lamidectomy performed in Plymouth Hospital within two hours of the injury. Death took place within six hours of the operation.

Lieutenant-Colonel R. W. Wright considered that the interesting case described by Major Spencer typically showed the value of radiography to surgery. Without this aid it would have been quite impossible to arrive at a correct diagnosis.

As to the advisability of performing laminectomy in fracture dislocation of the spine, Lieutenant-Colonel Wright thought that, when there was immediate, complete and permanent paralysis, laminectomy was not a justifiable operation, inasmuch as the symptoms pointed to irremediable damage to the cord. He mentioned a case, which had been under his care, in which it was found, at the *post-mortem* examination, that there was complete transverse disintegration of the cord without any obvious lesion of the membranes or encroachment on the lumen of the spinal canal.



Fracture of the Fourth and Fifth Cervical Vertebræ.

Face p. 68.

Clinical and other Notes.

PARTIAL GASTRECTOMY FOR CANCER—SOLDIER STILL SERVING TWO AND THREE-QUARTER YEARS AFTERWARDS.

By Major M. P. HOLT.
Royal Army Medical Corps.

A soldier is not necessarily unfitted for further service by reason of the surgical removal of even severe trouble.

Gunner D. was sent to the Royal Herbert Hospital, Woolwich, with a history of persistent vomiting and progressive wasting during the previous five months; latterly he had been unable to retain any food, the wasting had become alarmingly rapid, and rectal feeding had been his sole support for several days.

On arrival, palpation readily revealed a pyloric tumour. On December 10th, 1906, partial gastrectomy with gastrojejunostomy was done. The carcinomatous growth involved the pylorus, the orifice of which was a mere pinhole. Streaks of visible cancer reached along the lesser curvature nearly to the cardia, and glands in the lesser omentum were visibly enlarged.

On microscopical examination the growth was found to be a columnar-celled carcinoma. Considerably more than half the stomach was necessarily removed, the line of section being nearly a vertical one close up to the cardia, leaving only the fundus for lateral anastomosis with the jejunum.

The relief was immediate; within twelve hours he could take 2 ounces of water or beef-tea without vomiting; this had been impossible for some weeks. Recovery was quite uneventful.

He was discharged to sick furlough on February 14th, 1907, and reported himself fit for duty on April 17th; he then weighed 11 st. 8 lb. (he was so ill on arrival that it was not possible to weigh him before operation). He again reported himself, then doing his duty, on September 28th, 1908; his weight was 10 st. 10 lb. He was sent for report on September 7th, 1909, and though still doing duty, said he had lost weight a little lately; the Senior Medical Officer of his station reports that he now weighs 10 st. 3 lb.

NOTES ON A CASE OF COMPOUND DEPRESSED FRACTURE OF THE SKULL.

By Major K. B. BARNETT and Lieutenant C. M. RIGBY.
Royal Army Medical Corps.

H. L., able seaman, H.M.S. "Albion," aged 27, was admitted to the Military Hospital, Dover, on May 10th, 1909, with the following history: "Whilst preparing the collier for coaling ship this afternoon, he was struck

on the head by a falling block. He received a compound fracture of the skull with depression of the fragment of a stellate fracture, and some laceration of the brain substance. He was immediately landed and sent to the Military Hospital, Dover, for operation."

On admission he was dazed but conscious, the pupils were equal and there were signs of paralysis in the right arm and leg. On examination it was found that he had a 2½-inch wound extending vertically from the left of the middle line over the posterior part of the parietal bone, with a depressed fracture of the bone to be seen and felt at the bottom. After shaving the head and cleansing the parts, chloroform was administered. The wound was enlarged, a cross incision being made, the pericranium was reflected, and the extent of the injury defined. As it was found impossible to raise or loosen the most depressed but tightly wedged-in triangular piece of bone at the anterior lower angle of the fractured area in any other way, the ⅝-inch trephine was applied close to this spot, as shown in the sketch (No. 3), and this piece which had caused the injury to the brain was first removed. Two other trephine openings of the same size were necessary before the whole depressed area, which measured about 2 square inches, and was fissured in several directions, could be raised flush with the surrounding bone. The circles of bone were not replaced. The whole area was well cleansed. There was considerable bleeding from the posterior trephine opening, which was stopped by packing with a gauze wick. The pericranium was replaced and stitched in position as far as possible with fine silk, and two gauze drains were left after the skin wound was closed, one already referred to, and the other in the place where the piece of separated bone had been removed and the brain exposed. A large gauze and wool dressing was applied and fixed by a bandage, ¼ grain morphia was given hypodermically, and the patient removed to bed. He recovered consciousness and had little pain. There was a good deal of oozing during the night, although the head was well raised and an ice-cap applied, and the outer dressings had to be changed; 5 grains of calomel were given and the urine was drawn off with a catheter.

May 11th.—The right arm and leg are completely paralysed, but the face and special senses are not affected. Passed water. Temperature, 99° F.

May 12th.—No more bleeding, dressings changed and skin sutures removed. Evening temperature 100° F.

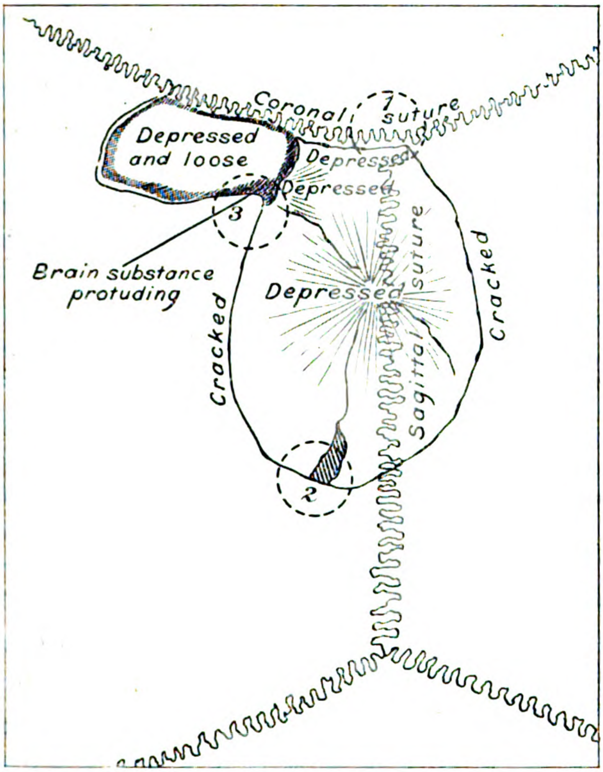
May 14th.—He slept without any sedative last night. Morning temperature, 99° F. Bowels open. Quite sensible, drowsy, but has no pain. No signs of inflammation. Gauze drains removed and wound redressed. His right arm and leg are massaged daily.

May 15th.—He showed slight movements of the right knee and thigh to-day. Arm still paralysed.

May 27th.—He had slight movement of ankle and toes of right foot in conjunction with movements of leg.

May 31st.—He first showed slight movements of right forearm and wrist in conjunction with movements of right leg.

June 4th.—He is able to move the arm independently of the leg, and is also able to walk with help.



H. C. L., aged 27, able seaman, H.M.S. "Albion." Admitted to Military Hospital, Dover, May 10th, 1909.

[*Drawing by Staff-Surgeon H. H. Jeans, of H.M.S. "Albion."*

Since then he has had massage and electrical treatment daily, and has gradually improved. The flexor and extensor muscles of his ankle and foot are still very weak and only move in conjunction with movements of the thigh and knee. He has increasing use of his arm, but has no power yet over the extensor muscles of the forearm.

July 4th.—To-day he was transferred for further treatment to the Royal Naval Hospital at Chatham, the following being his condition on transfer: The head wound is healed and hair growing. There is some flattening over the parietal region on the left side. The muscles of the right

arm are still weak, but he is gradually getting increased power in them. He has still no use of the extensor muscles of the forearm, but they react briskly to the interrupted current. He is unable to perform flexion of the wrists and fingers as a separate movement, but only with movement of the arm as a whole. The extensor, adductor, abductor and flexor muscles of the hip- and knee-joints work well, but he has little use of the muscles of the foot, and his co-ordination with them is similar to that of the forearm and hand. They react sluggishly to the interrupted current. The reflexes in arm and leg are all very brisk. Ankle clonus is well marked. No Babinski's reflex.

August 11th.—The following note as to the electrical reactions, &c., has been furnished by Fleet-Surgeon G. A. Dreaper, from the Royal Naval Hospital at Chatham: "Marked irritability. Arm supinator jerk. Leg-patella clonus and ankle clonus and extensor plantar reflex. Reaction both to faradism and galvanism present. In the arm, triceps and extensors react more actively to galvanism than those on the sound side. In the leg the muscles supplied by the sciatic nerve and its branches act more briskly to galvanism than in the sound side. No qualitative changes could be elicited."

This patient left the Royal Naval Hospital, Chatham, at his own request after being invalided on August 13th, 1909, and the last notes made on his case stated that he had no power of extension of the wrist or fingers. The pronators and supinator were regaining power, and the muscles of the upper arm were working well. The thigh muscles were working well, but the calf and anterior muscles badly, there being inco-ordination of foot movements, "the foot being brought down with a stamp and inward turn."

Staff-Surgeon H. H. Jeans, R.N., of H.M.S. "Albion," who assisted at the operation, has very kindly made the sketch which accompanies and illustrates this report.

AN EXTEMPORISED HIGH-FREQUENCY APPARATUS.

By Lieutenant T. B. NICHOLLS and Serjeant G. F. HURRAN.
Royal Army Medical Corps.

The increasing use of high-frequency electricity in nervous diseases, especially those of neurasthenic and hysterical origin, and the fact that the apparatus is not supplied in military hospitals, led us to construct the apparatus ourselves.

I.—The Apparatus.

The regulation coil (*a*) for X-ray work supplies the induced current. This current is then led to a spark gap (*b*) consisting of two zinc rods, the ends of which are rounded (*c*) so that a quieter spark results. These are enclosed either by an ordinary lamp glass, or a 'tabloid' bottle with

a hole drilled in the bottom and a cork at the other end. This is necessary in order to deaden the noise of the discharge. One of the zinc rods is carried on a vulcanite handle (*d*) to adjust the length of the spark. This handle slides in a hole in the cork. The rods are connected to the outer coating of two Leyden jars (*ee*) made by pasting sheets of lead foil on either side of two discarded glass tops of bedside tables (*f*). If no lead foil is available the "silver paper" from a cigarette box answers equally well. The plates are placed upright in a box (*h*) at a distance of at least 9 inches, with a board (*i*) on top carrying the bottle containing the spark gap. A fairly large margin should be left between the edge of the tinfoil and the edge of the glass, otherwise a spark will cross. The inner coatings (*gg*) of the Leyden jars are connected to a solenoid (*j*) made of about twenty-four turns of thick insulated cable copper wire wrapped on a bottle covered with a sheet of gutta-percha; the ends of the solenoid are frayed out (*kk*) so that any excess of electricity may escape by a brush discharge into the atmosphere; from one end of the solenoid an insulated wire is carried to the resonator (*l*). This is simply made as follows: A circle of about 9 to 10 inches in diameter is marked on two boards (*mm*), and on these circles five ordinary broom handles (*n*) cut to a length of about 2 feet 6 inches are nailed. These handles are notched at intervals of about 1 inch with a saw, and on the framework thus formed a spiral of thick uninsulated copper wire is wound (*o*), taking care that it fits into the notches and does not touch any other turn of the spiral. To the bottom of the spiral the lead from the solenoid is fastened, and the electrode with which the patient is treated is led from the top of the spiral (*p*); or if a stronger current is required the origin of the electrode can be approached turn by turn towards the bottom of the spiral by means of the sliding contact described below. This electrode is made of insulated cable copper wire frayed at the end (*q*), enclosed near the extremity by a glass or vulcanite tube, preferably the latter, for convenience of handling and insulation (*r*). A current of about 6 to 10 ampères and 20 to 30 volts should be used for the induction coil. The whole apparatus costs less than 5s., and works just as well as an expensive affair costing £20 or so.

The theory of the apparatus is as follows:—

The current of the induction coil charges the outer coatings of the Leyden plates, inducing an equal and opposite charge in the inner coatings. When this charge gets up to a certain strength—varying with the length of the spark gap—a spark passes and the charge is discharged, and both coatings return to their normal condition.

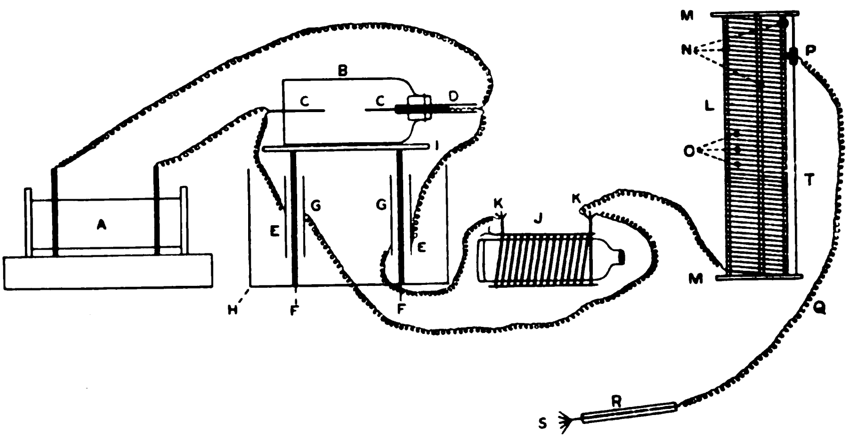
These varying states are carried on to the solenoid, where any strength over that wished for escapes from the many points of the frayed-out wire. The remainder is carried on to the resonator.

The resonator, as its name implies, vibrates (electrically) with the solenoid as a sounding box vibrates (acoustically) in sympathy with a

tuning fork. This being the case the resonator must be tuned with the solenoid. This is accomplished by means of a sliding contact (P) which travels up a rod (T) and touches one turn of the copper spiral at a time. The electrode is fixed to this contact. By sliding the contact up and down the resonator can be tuned to the solenoid.

As the sounding box intensifies the effect of the tuning-fork, so the resonator intensifies the effect of the solenoid.

The E.M.F. is intensified at the expense of the current strength. The therapeutic properties of this form of electricity are due to the high E.M.F.



(*a*) Induction coil. (*b*) Bottle enclosing spark gap. (*c*) Zinc rods forming spark gap. (*d*) Vulcanite handle to adjust length of spark. (*e*) Outer coatings of Leyden jars. (*f*) Glass plates. (*g*) Inner coatings of Leyden jars. (*h*) Box inside which plates are fastened. (*i*) Board carrying spark gap. (*j*) Solenoid. (*k*) Frayed ends of solenoid. (*l*) Resonator composed of: (*m*) Boards. (*n*) Broom-handles. (*o*) Copper wire. (*p*) Sliding contact. (*q*) Electrode. (*r*) Vulcanite or glass tube. (*s*) Frayed ends of electrode.

II.—Method of Use.

(1) Local application.
(2) Auto-condensation.
(3) Auto-induction.
(4) To produce the X-ray.

This may be carried out in several ways:—

(1) *Local application.*—(*a*) The electrode described may be approached to the patient; when large, long sparks will pass. These produce hardly any sensation, and look more alarming than they really are. The organs of special sense do not respond. This discharge is usually termed the effleuve.

(*b*) This may be reversed by the patient holding the electrode while

standing on a glass plate—the operator then draws the discharge from him, usually by means of the fingers. If preferred an earthed wire may be used.

(*c*) A somewhat startling method—useful in neurasthenia, hysteria, and especially malingering—is for the medical officer to hold the electrode while standing on a glass plate. Whenever he approaches the patient with his fingers, sparks will pass, with considerable moral and mental effect, especially when done unostentatiously in the darkened room.

(2) *Auto-condensation.*—The patient plays the part of one of the coatings of a Leyden jar. A sheet of metal is laid on the couch and a layer of felt or several blankets is placed between the patient and the metal. The metal is connected with the resonator, and the patient grasps an earthed wire.

(3) *Auto-conduction* is not possible without special apparatus; a huge spiral of copper wire is made and the patient placed inside. This is analogous to the primary and secondary wires of the induction coil.

(4) *To Produce the X-ray.*—It is stated that this is possible and that the ray is more penetrating, but we have been unable to obtain it with the service tubes. Nor did the effleuve excite the screen of a cryptoscope.

A NEW SUGGESTION FOR THE PREPARATION OF POTABLE WATER.

By Captain A. H. HAYES.
Royal Army Medical Corps.

During the Health Congress, recently held in Leeds, the apparatus to be described was demonstrated by Dr. Myer Coplans, in the Medical School of the University. Dr. Coplans has found that the gelatinous precipitate of aluminium hydrate, formed by mixing aqueous solutions of sulphate of aluminium and lime, in equivalent proportions, fulfils the double purpose of dragging down with great rapidity, under the action of ordinary gravity, visible suspended matter in water, at the same time entangling in its mesh 99 per cent. of organisms present; and acting as a most efficient filter.

He states that he is carrying out similar experiments with other colloidal precipitates, *e.g.*, with silicates and iron preparations.

The demonstration was divided into three parts:—

(1) *Demonstration of the Clarifying Power of the Gelatinous Precipitate.*—Four glass cylinders were shown, as depicted in fig. 1. The first three, (*a*), (*b*), and (*c*) contained tap-water, in each of which had been placed a similar quantity of dirty, black mud: (*a*) contained mud and tap-water only; to (*b*) had been added 5 per cent. of decinormal solution of aluminium sulphate; to (*c*) the equivalent quantity of gelatinous precipi-

tate; the contents of (*d*) were the same as those of (*c*) without the mud. The four cylinders were subjected to violent agitation, and placed on the table. The diagram (fig. 1) is an attempt to show the state of affairs after the lapse of five minutes. In (*a*) practically no visible sedimentation has taken place. In (*b*) there is some slight clearance of a small layer of water at the top, with signs below of sedimentation of the suspended matter. [*N.B.*—A general turbidity persists for twenty-four hours.] In (*c*), at the top is a small layer of absolutely clear water, a middle layer much less turbid than the upper layer in (*b*), while a dense, black precipitate has sunk to the bottom. The fourth cylinder (*d*) is to show that the rate of settling of the gelatinous precipitate is very much less in the absence of visible suspended matter.

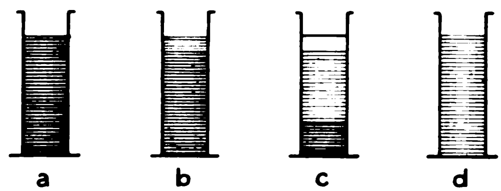


FIG. 1.

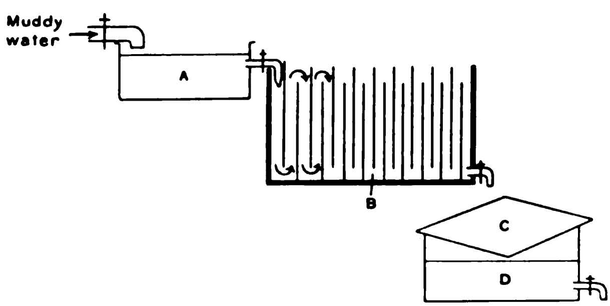


FIG. 2.

(2) *Demonstration of the Gelatinous Precipitate as a Filter.*—A metal box, its bottom perforated with holes, was supported on tripod stands, a glass vessel being placed below it. In the box was placed a sheet of ordinary blotting-paper, folded in four thicknesses, the surface being painted over with gelatinous precipitate about $\frac{1}{12}$ inch thick. On this surface was run a solution of aqueous methylene blue ($\frac{1}{2}$ per cent.). The resulting filtrate was absolutely colourless water, the ultra-microscopic particles of methylene blue having been entirely kept back.

(3) *Practical Application of the Principle, in the shape of a Small "Plant," suitable for a Cottage Supply of Pure Drinking Water* (fig. 2).—

A stone tank (*a*) was arranged to receive a supply of dirty, muddy water, and in this tank was placed aluminium sulphate ($\frac{1}{10}$ grain to the gallon) for the purpose of rough, preliminary clarification. The roughly clarified water was run off by a tap into the clarifying box proper (*b*). This was a zinc box 30 inches long by 12 inches wide by 18 inches deep, containing "baffle-plates" of window-glass arranged as shown in the diagram, so that all the water passing through the box had to travel under one plate and over the next. There were nine compartments in all, of which the first three in the apparatus shown contained gelatinous precipitate; the number of compartments requiring the precipitate would vary with the turbidity of the water under treatment. The capacity of the box is about 20 gallons. The rate of flow of water through it must be slow, or the precipitate at the bottom of a compartment may be lifted with the general flow, and carried over the next "baffle-plate." The clarified water escaped, by means of an exit-tap at the further end, and was run on to the "filter" (*c*), through which it percolated into the vessel (*d*) as practically sterile water; this "filter" is the essential part of the apparatus. It consists of a "sand-mattress," made of stout linen or canvas, 24 by 21 inches, packed with fine sand so as to be $\frac{1}{2}$ inch thick. This is sterilised by boiling, or steaming, or by pouring boiling water through it, and the upper surface is painted over with gelatinous precipitate. The water thus filtered is claimed to be practically sterile, 99·9 per cent. of organisms (*Bacillus coli* the organism experimented with) having been removed. The demonstrator of this apparatus states that the rate of filtration through a prepared sand-mattress of the dimensions given above, using a fairly clear water previously untreated, is 100 gallons in twenty-four hours.

This demonstration is described in the hope that the suggestion may perhaps be of very material value in Military Field Service, bearing in mind the following points in connection with the two component parts of the filter:—

The sand-mattress is extremely simple of manufacture: its cost is similarly small; it is very easily packed, equally easy of transport, and unlikely to be damaged thereby; it is also very easily rendered sterile.

The gelatinous precipitate is made from two of the most inexpensive chemicals on the market, and its preparation is childishly easy in the most inexperienced hands.

SANITATION CLASSES FOR SOLDIERS.

By Major R. J. BLACKHAM.

Royal Army Medical Corps.

The theoretical and practical instruction of N.C.O.'s and men in sanitary duties is now an important feature of the work of Indian Station hospitals. Some officers have experienced difficulty in ascertaining

exactly what should be taught in their classes and for their guidance, and in order to secure some degree of uniformity throughout the First Division, the following syllabus, which is similar to one devised by Major Clements for the Ninth Division, has been drawn up and approved by the General Officer Commanding. It is submitted for publication in the hope that it may be useful to officers in other parts of the world.

1st (PESHAWAR) DIVISION.

Syllabus of Course of Instruction of Non-Commissioned Officers and men in Sanitary Duties. *Vide* Indian Army Order 354 of 1907. Approved by the General Officer Commanding,

1st (Peshawar) Division, Cherat, August 1st, 1909.

The N.C.O's. and men will be struck off duty for three weeks.

This period will provide fifteen working days as instruction will not be carried out on Sundays and Thursdays.

The course will consist of at least twelve lectures, and at least twelve practical demonstrations.

The lectures and instruction will be given by a selected medical officer, but all classes will be examined by the Divisional Sanitary Officer.

THEORETICAL INSTRUCTION.

First Lecture.

Introduction.

The importance of sanitation in war.

The causes of disease. The means of infection.

The more important communicable diseases of soldiers.

Mosquitoes and malaria. Flies and enteric fever.

Second Lecture.

Air and Ventilation.

Simple physiological principles for need of fresh air.

Constituents of air. Sources of impurity of air. The composition of dust. The sweeper in relation to the air of bungalows.

Consumption and ventilation. Spitting and the spread of disease.

The tooth-brush in relation to personal ventilation. Animals and pollution of air. The necessity for ventilating bedding.

Third Lecture.

Water and Water Supplies.

Pure water the prime necessity of military life. Its proportion in the body and in most articles of common consumption. Quantity of water required. Appearance and palatability as a guide to suitability for drinking purposes. Diseases caused by water. Sources of water. The storage of water. The pollution of water.

The purification of water. The water-bottle. Water discipline.

FOURTH LECTURE.

Food and Alcohol.

Varieties of food required. The quantity of food needed.

The methods of cooking and their effects on food. The different systems of messing. Food on active service. The value of sugar as a food. Tinned foods and their examination. Alcohol in peace. The danger of "tots" of rum on cold nights. Spirits in war.

FIFTH LECTURE.

Clothing.

Reasons for use of wool. The necessity for well-fitting garments. Clothing materials. The importance of boots and socks as essentials to marching efficiency. Means of waterproofing. The cholera belt. The danger of belts and putties worn round the waist. The dangers involved by "chills" in the Tropics. The reasons for the frequent change of garments and the desirability of nightshirts or pyjamas.

SIXTH LECTURE.

The Care of Barracks.

Overcrowding and its dangers. Barrack-rooms. Cookhouses. Water storage. Ablution rooms. Latrines. Urinals. Disposal of kitchen and table refuse.

SEVENTH LECTURE.

Disposal of Refuse and Excreta in Barracks.

Various methods. Points to receive special attention.

Flies and dangers from them.

EIGHTH LECTURE.

The Camp and the March.

Sites. Tents. Sleeping shelters. Cooking places. Latrines. Urinals. Disposal of refuse. Effects of marching. Halts.

NINTH LECTURE.

Disinfection and Disinfectants.

The objects of disinfection. Meaning of terms. Various methods in use. Short account of chemical disinfectants used in the army. Practical application of disinfection. Disinfection of wells.

TENTH LECTURE.

Venereal Disease.

The effects of venereal disease on military efficiency. Prevention.

ELEVENTH LECTURE.

Sanitary Organisation in Peace and War.

Water duties in peace and war. Sanitary squads. Sanitary sections.

Twelfth Lecture.

Personal Hygiene.

The necessity of washing the hands before meals. The dangers of handling food supplies with unwashed hands. Baths and bathing. The care of the feet.

PRACTICAL TRAINING.

1. Barrack Rooms and Dining Halls.

Visit and demonstration on :—

(1) Cubic space and ventilation. (2) Water storage, especially in hot weather. (3) Food storage. (4) Washing-up after meals. (5) Sweeping. (6) Night urinals. (7) Pets and their dangers.

2. Cookhouses and Ablution Rooms.

Visit and instruction on :—

(1) Cooks and their clothing. (2) Personal cleanliness of cooks. (3) Washing-up. (4) Disposal of refuse. (5) Disposal of greasy water. (6) Prevention of fly infection. (7) Dangers of pools of water in dark places.

3. Latrines and Urinals.

Visit and instruction on :—

(1) Sites. (2) Construction. (3) The "wet" and "dry" systems of sewage disposal. (4) Treatment of latrine pans. (5) Supervision of sweepers.

4. Disposal of Excreta.

(1) Visit to incinerators. (2) Visit to trenching ground. (3) Demonstration on the care of Crowly carts.

5. The Practical Construction of Camp Latrines, Urinals, and Crematories.

6. Water Supply.

(1) Visit to station supply and wells. (2) Demonstration of methods of filtration by mule filters, &c.

7. Mineral Water Manufacture.

(1) Visit to a factory. (2) Explanations of methods of manufacture. (3) Dangers of contamination. (4) The making and storing of syrups. (5) The storage and cleansing of empty bottles.

8. Dairies.

Visit to Government or other Dairy and practical demonstration of :—

(1) Storage of milk. (2) Storage of butter. (3) Pasteurisation. (4) Cleansing of utensils. (5) Supervision of milkers.

9. Slaughter Houses.

Visit and demonstration on :—

(1) Inspection of animals. (2) Inspection of meal. (3) Disposal of offal.

10. Regimental or Cantonment Bazaar.

(1) Visit and note methods of sewage and refuse disposal. (2) Inspection of native mineral water factory. (3) Inspection of all places where food and drink are sold.

11. Bakeries.

Visit and inspect methods of making bread:—

Demonstration of dangers from careless storage of materials, dirty hands, &c.

12. Mosquito Brigades and their Duties.

Practical demonstration at Station Hospital of methods of disinfection in actual use at the Station.

Demonstration on the inspection of ordinary articles of food.

Echoes from the Past.

THE STORY OF THE ARMY SURGEON AND THE CARE OF THE SICK AND WOUNDED IN THE BRITISH ARMY, FROM 1660 TO 1688.

By Major H. A. L. HOWELL.
Royal Army Medical Corps.

When Charles II. was restored to the throne of his ancestors in 1660, he received the whole of the Parliamentary Army into his service. England, however, at that time had no need of so large a standing army, nor could the finances of the country bear the strain of its support. The Army was therefore disbanded, gratuities and other advantages being granted to the discharged soldiers, and, on the same day, some of them were re-embodied to form the foundation of the regular Army, which, from that day to this, has gallantly sustained the honour of our country in all quarters of the globe.

The newly-formed Army consisted of the Earl of Oxford's cavalry regiment, which became the Royal Horse Guards, and Monk's regiment of foot, now the Coldstream Guards, and to these were added the Life Guards and the Foot Guards which had been with Charles in France. The Scots Guards was also raised the same year in Scotland. In 1661, the Royal Scots was transferred from the French service to our own. This regiment, the oldest in the Army, had existed as a regiment from 1613, when it served under Gustavus Adolphus, had later passed into the service of

Holland and then into that of France, where it absorbed some Scottish soldiers, the successors of a body of Scots in the French Army, whose records go back to the year 882.

In 1661, the British standing Army amounted to 5,000 men, divided into two cavalry regiments and six regiments of foot. They were paid by the Crown.

Tangier becoming a possession of the Crown, a further augmentation of the Army became necessary in order to provide that place with a garrison. Later, troubles in Ireland and elsewhere led to a further increase, and in 1684 the military forces amounted to 16,000 men. The last muster-roll made out shortly before Charles's death, however, shows that at that time he had only 4,000 men in his pay.

The standing Army of Charles II. consisted then of the Household troops: the Cavalry, clad in "breast, back and pot," and armed with swords, carbines, and pistols; the Foot Guards, made up of musketeers and pikemen, the former wearing red coats turned back with blue, and the latter coats of a silver colour, also with blue facings; regiments of horse armed similarly to the Horse Guards, but without carbines till later; and regiments of foot, made up of musketeers and pikemen, also clothed in red. To each regiment of horse and foot a company of Grenadiers was attached. These wore a distinctive head-dress—a red cap lined with blue and laced with silver. They had a shorter firearm, wore swords, and carried grenade pouches. Dragoons first made their appearance in our Army at this time. They were originally a species of mounted infantry, were armed with matchlocks, carried each a "collar of bandaliers" and also "a bayonet or great knive." (Warrant, dated April 2nd, 1672.) This was the first introduction of the bayonet into our Army, and was copied from the French Army, where it had come into general use in 1671. This bayonet was screwed into the muzzle of the musket, which thus became temporarily useless as a firearm.

The troops were well paid, a private in the Foot Guards receiving 1s. a day, in a regiment of foot 9d. A trooper was paid 2s. 6d. a day. With regard to the pay of the regimental surgeons and their mates, we learn from the earliest establishment of Charles II.'s new Army, which bears date January 26th, 1660 (State Paper Office), that amongst the Field and Staff Officers of each regiment of foot was a surgeon and his mate, the pay for the two being 6s. 6d. a day. A pay list of Cornwall's Regiment [afterwards the 9th Foot and now the Norfolk Regiment], dated 1686, also tells us

that the chirurgeon drew 4s. a day, and the chirurgeon's mate 2s. 6d. They are shown on the staff of the regiment, next after the Major and before the Adjutant and Quartermaster.

In 1661, a pay list of the Regiment of Horse Guards shows, "chirurgeon iv s, and j horse to carry his chest, ij s. . . . . vi s *per diem*." A similar entry occurs in a pay list of His Majesty's Own Royal Regiment of Dragoons, when raised from the four troops of Tangier Horse (and two freshly raised troops) in 1684.[1]

The Life Guards at first consisted of three troops, each of which had its surgeon, and, according to the establishment in 1661, they received pay at the rate of 6s. a day and 2s. a day for a horse. The surgeons were named John Troutback, Thos. Woodall, and John Robinson. Later the first two troops became the 1st and 2nd Life Guards, each with a surgeon.

It would appear that at first when regiments were split up into detachments the pay of the surgeon ceased, for, in October 1663, when the Foot Guards were broken up into detachments the pay of the Chaplain, Quartermaster and Surgeon was stopped until November 1664, when the King, as a result of a petition, directed their re-establishment and the continuation of their pay. At a later date, when part of a regiment was detached for duty it appears to have been the custom for the chirurgeon of the regiment to supply a "mate" to take medical charge of the troops while away on duty. Thus, in 1678, the following certificate for the payment of such a mate was given. (War Office Records, quoted by Gore). "I doe most humbly certify, that in consideration of a party designed for Flanders out of His Majesty's Regiment of Horse Guards, to be commanded by Major Sir Francis Compton, upon the first forces that were sent thither, Mr. Sackville Whittle, Chirurgeon to the said Regiment of Horse, had order to provide an able chirurgeon to attend that party as his mate, and did contract and agree with an able chirurgeon pursuant thereto, on the 14th March last past, from which date the said mate is by contract to enter His Majesty's pay, any provision being made by the late establishment for the said mate only to commence from the 1st May inst., the said chirurgeon will hereby fall short of pay due to him by the said contract, from the 14th day of March inclusive to the said 1st May, being forty-eight days, which according to His

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[1] The first surgeon of this regiment—the First or Royal Dragoons—was named Peregrine Yewel.: John Gally was surgeon to the Scots Guards in 1680, and was apparently succeeded by John Baillie in 1683.

Majesty's Establishment will amount to eight pounds eight shillings.

"Given under my hand the 31st day of May, 1678.

"JOHN KNIGHT."

Each regiment of foot then at this time had its surgeon and surgeon's mate, a cavalry regiment had a surgeon only, and parties of troops on detached duty were accompanied by a surgeon's mate. In addition, when an army took the field, a physician was on the staff of the general officer commanding, and he was assisted by an apothecary. In the list of "General officers with those of the Trayne," when the Earl of Peterborough commanded the forces at Tangier, in 1661, we find, for instance, "Phisitians two at 10s. with an apothecary at 5s."

It would appear that on the first establishment of a standing Army charges for drugs were made against the Crown. To place these charges upon the footing of an allowance the following orders were issued in 1673:—

"Charles R.

"Whereas, for the preventing of the great and uncertain charges of Apothecaries' bills of physic and internal medicines for sick soldiers, We have thought fit to allow forty shillings a year to Richard Whittle for providing of physic and internal medicines, besides the forty shillings for each company allowed to the Surgeon of the Regiment of Our Foot Guards for external medicines yearly, which said allowance of forty shillings yearly for physic or internal medicines is to commence from the twentieth of September last. Our Will and Pleasure, therefore, is that you take notice thereof, and give it in orders, that when the non-commissioned officers and private soldiers respectively shall be sick, the said Richard Whittle may be applied to for internal medicines, as well as hurt men are to apply the Surgeon of the Regiment for external medicines when they need the same.

"Given at Our Court at Whitehall, the 24th day of January, 1673.

"By His Majesty's Command,
"Arlington."

"To Our Trusty and
Well-beloved Colonel John Russell,
or other the Officer in Chief
Commanding Our Regiment of Foot
Guards under his command."

"Charles R.

"Whereas, for the preventing of the great and uncertain charge of Apothecaries' bills of physic and internal medicines for sick soldiers,

We have thought fit to allow twenty shillings a year for each Regimental Company of three score soldiers besides officers, to the respective Surgeons of Regiments, from the twentieth of September last, for the providing and furnishing of physic and internal medicines, as well as there has been and is forty shillings yearly, for each such company allowed to the said Surgeons for external medicines for the respective requirements in which they serve. Our Will and Pleasure therefore is, that you take notice thereof, and that you give it in orders, that when the non-commissioned officers or private soldiers of your Regiment shall be sick or wounded, the Surgeon of your Regiment do provide physic or internal medicines, as well as external medicines for them.

"Given at our Court at Whitehall, the 24th day of January, 1673.

"By His Majesty's Command,
"Arlington."

"To Our Trusty and
Well-beloved Colonel
Sir Charles Littleton, or the
Officer in Chief Commanding
Our Most dear Brother James,
Duke of York's Regiment."

The English Army had few opportunities of active service during the reigns of the last two Stuart Kings, but portions of it saw a good deal of fighting under the Duke of Monmouth with the French against Holland, and again under Sir Walter Vane and Sir William Ballandyne with the Hollanders against France. New York was also taken from the Dutch. In Scotland, and in Ireland also, some hard blows were struck, but the most important achievement of British troops was the gallant holding of Tangier by a handful of men from 1662 to 1684 against the whole force of the Moroccan Empire. Tangier was part of the dowry of the Infanta Catherina of Portugal, Charles II.'s Queen. The importance of Tangier as a British possession, especially in connection with the protection of our commerce with the Mediterranean, was fully realised and a strong force was raised as a garrison for the place. From "An establishment of the Forces raised the 10th day of October, 1661, for his Ma^{ties} service in the Kingdomes of Sus, Fez, and Morocco, under the comand of his Excellencie Ye Earle of Peterburgh," we gather that the force consisted of "his Exc^{ly} owne Regiment of Foote" 1,000 strong, another regiment of foot of the same strength and two others each 500 strong. Each of these

regiments had its surgeon and surgeon's mate, on the usual rates of pay, 4s. a day and 2s. 6d. respectively. A troop of horse, 100 strong, was also raised, and among the Field and Staff Officers of Horse was "a chirurgeon at iiijs. with a horse at 2s. a day." A surgeon at the same rate of pay was also provided for a troop of of 80 "Portugall Horse," and amongst the "General Officers with those of the Trayne" were "phisitians two at 10s. and an Apothecary at 5s." The troops were mostly old soldiers taken from the garrison of Dunkirk, and the troopers were, according to the *Mercurius Publicus*, "goodly men and stout and well furnished to boot, both for battle and for show." The Earl of Peterborough took possession of Tangier in January, 1662, but gave over command to the Earl of Teviot in 1663. This gallant old soldier, finding that the Moors were hostile, decided, as he said himself, "that they should have enough of it." Many excursions were made into Morocco and the enemy overthrown wherever met, but the Earl was unable to prevent the Moors investing the town and reducing the garrison to great straits. In skirmishes outside the walls of Tangier the British losses amounted to 250 men before the end of 1662, and, in addition, about another 250 had succumbed to sickness. On May 4th, 1664, the Earl of Teviot, when making a reconnaissance in force some miles into Morocco, fell into an ambuscade. His troops were surrounded and he and "19 commissioned officers, 15 gentlemen and volunteers, the doctar, together with 396 non-commissioned officers and privat soldiers" (letter to King Charles) were slain. The "doctar" was named White and was a "reformado," that is, an officer serving as a volunteer or an officer of a disbanded corps attached to another corps and receiving pay. It was a gallant fight against odds, ten to one, no quarter asked or given, and only nine men escaped and got back to Tangier. The surgeon of the Earl of Teviot's Regiment was named George Elliot, and his mate Robert Smalswood.

In 1664 complaints were made of the way the soldiers "die apace" for want of proper food. In January, 1668, a reduced establishment of one regiment of foot, 1,400 men, and half a troop of horse was adopted.

A military hospital was established at Tangier. In the estimates there was allowed "for the Hospitall besides Souldiers' pay when sick added to the Hospitall towards maintenance. . . . £1 10s. diem, £42 mensem." "Of which an exact account to be rendered every three or six months." The soldiers' pay, however was at times as much as twelve to twenty-five months overdue.

In July, 1669, the men fell sick at the rate of ten a day. The maintenance of the hospital from May 12th, 1666, to June 11th, 1669, cost £2,019 14s. 9d. (Pepys' accounts). In the year 1674-5, £547 10s. was allowed for the support of the hospital. The hospital staff consisted of "the phisitian at 15s. per diem," "a chirurgeon at 4s. per diem and a chirurgeon's mate at 2s. 6d. per diem." At last, in 1680, the numbers of the enemy had increased so greatly and they had become so skilled in the art of war that the garrison was in a very precarious situation. In their hour of need, however, there arrived a reinforcement consisting of a battalion of Foot Guards, sixteen companies of Dumbarton's (the Royal Scots), six troops of horse and three squadrons of Spanish cavalry. The old Tangier accounts show the following payments: £20 to "the Chirurgeon in Charles Fort, Tangier, for several Medicaments and Instruments of Surgery left there." (Charles Fort was captured by the Moors in 1680.) Also, "£32 9s. for quarters and cure of sick and wounded soldiers of Earl of Plymouth's Regiment" (afterwards 4th King's Own), and £50 2s. 7d. "for two chests of old linen and one chest of medicaments sent to him at Tangiers." (Audit Office Declared Accounts.) On September 27th, 1680, the greater part of the garrison, amounting to 4,000 men, marched out of Tangier to attack the Moorish entrenched camp. Fifteen thousand Moors came out to meet them, but they were unable to withstand the musketry fire of our infantry and the rush of the pikemen, and fled to their works. Our infantry having won the ramparts threw down a part of them, so that the cavalry rode into the Moorish camp and thoroughly worsted the enemy. It was a complete victory for the British. But the victory was of little avail, for Parliament refusing to advance the necessary funds for the maintenance of the garrison, Charles decided to give up the place. Towards the end of 1683, Admiral Lord Dartmouth arrived with a fleet and, after destroying the mole and the fortifications, in April, 1684, withdrew the garrison, so closing a brilliant chapter in the history of our Army.

War was declared against Holland in 1664. This was a naval war, but the Army was also concerned as large numbers of soldiers served on board our ships as marines. Thus, in the fight off Lowestoft in June, 1665, a detachment of Guards was on board the "Royal Catherine" and five companies of Guards and an Irish regiment were at Sole Bay. It seems probable that the regimental surgeons accompanied them.

During the Great Plague in London the troops in London were

encamped, as a precaution, in Hyde Park. Half the Guards, however, left London with the King.

In 1670 we were again at war with Holland, and, in 1672, there being a lack of military surgeons, the King ordered the Company of Surgeons of London to provide twenty chirurgeons and twenty chirurgeons' mates for military service.

On the outbreak of the war with the Dutch in 1664 a "Commission for the Sick and Hurt" was appointed. This Commission was empowered to appoint surgeons to the ports and to dispose of one-half of the hospitals in the kingdom. One-half of St. Thomas's Hospital in London was certainly set apart for the sick and wounded during the Dutch War. Evelyn notes in his diary that when acting as one of the Commissioners for the care of the sick and wounded during this war, he, on March 25th, 1672, visited Margate, and says, "Here we had abundance of miserably wounded men, His Majesty sending his chief Chirurgeon, Serjeant Knight, to meet me." Serjeant-Surgeon Knight certainly took a leading part in the medical affairs both of the Navy and Army, for his name frequently appears prominent in the official records in all matters concerning the sick and wounded. John Knight was a naval surgeon at the time of the Restoration and with "Dr. Quarterman, Physitian, and Mr. Richard Billing" attended upon the King in his voyage from The Hague to Dover in 1660. Later he appears to have acted as head of the medical department of the Navy, and there is evidence to show that he frequently acted in a similar capacity towards the Army. In 1661 he had become Principal Surgeon to the King (fee £26 6s. 8d., with pension £150) and in the same year became First Principal Surgeon to the King and First Serjeant Surgeon, with an annuity of £150 (Calendar of State Papers, Domestic, Charles II.). An entry in the Calendar of State Papers, July 5th, 1666, is as follows:—"John Knight, *Surgeon General*, to Williamson.[1] Lord Arlington agrees that no surgeons have their commissions signed till allowed by him (Knight) as Surgeon-General; also, that all orders for chests and medicines be directed to him, to see that they are sufficient, both in quality and quantity."

Another entry runs: "J. Knight to Williamson. Requests him to deliver Jacques Wiseman's Commission as Surgeon to the Earl of Carlisle's Regiment, and to speak a word for Mr. Browne, as the Earl of Ogle is not yet provided." Serjeant-Surgeon Knight was, therefore, clearly acting as Surgeon-General of the Army at this

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[1] Sir Joseph Williamson, secretary to Lord Arlington, Secretary of State.

time. According to Young's "Annals of the Barber Surgeons," Knight was Master of the Company of Barber Surgeons in 1663, 1669, and 1677.

Clode mentions that on July 13th, 1673-4, a surgeon was suspended for not having given tests of qualification under the late Act of Parliament, namely, the Test Act of 1672, which excluded Roman Catholics from "military office, command, or place of trust, and from receipt of pay," under certain pains and penalties.

Twenty years after Charles came to the throne, England was filled with infirm and maimed soldiers who had served their country in Tangier, Flanders, and the West Indies. It began to be felt as a reproach that our first-class fighting man should in his old age be left to starve or beg his bread. This feeling found fruit in the foundation of Kilmainham Hospital, in Dublin, in 1680, and Chelsea Hospital in 1682. Great credit is due to the Paymaster-General, Sir Stephen Fox, for his efforts in this direction. He submitted his scheme to the King and asked for a grant of land as a site. Charles offered the site of St. James's College, Chelsea, forgetting for the moment that he had already granted the same to Mistress Nell Gwynne. Nell, however, gracefully gave up her grant for the good of the soldier, and Chelsea Hospital, which was completed in 1690, is the British soldier's to this day. It was afterwards supported by one day's pay per annum from each soldier's pay.

By a regulation of January 1st, 1685, it appears that soldiers received a King's bounty of a year's pay for the loss of an eye or limb, or the total loss of the use of a limb, certified by the Surgeon-General. There was also a bounty for other wounds in proportion. N.C.O.'s and men disabled by means of wounds, at this time received daily pensions according to the following scale: Private soldiers, 5d.; drummer, 7d.; corporal, 7d.; sergeant, 11d.; first of the troops of guards, 1s. 6d.; light horse, 1s.; corporal of light horse, 1s. 6d.; dragoon, 6d.; corporal of dragoons, 9d.; master gunner, 1s. 2d.; common gunner, 7d.

King William III. on May 1st, 1689, extended these benefits to all soldiers of over twenty years' service, or who had become unfit for service.

Each of four soldiers in the 2nd Queen's, who had been wounded at Sedgemoor, was awarded £6 13s. 4d. (War Office Records).

At this time and for nearly a century after it was not unusual to find surgeons holding double commissions. The surgeon purchased a commission as an ensign, and drew, in addition to an ensign's pay, 2s. 6d. a day for hospital duty. On promotion such officers usually gave up the surgical part of their duties.

With the exception of the Serjeant-Surgeons, John Knight and Richard Wiseman, few Army Medical Officers took a prominent place in the profession. Wiseman requires a special memoir, but one other, John Browne, may be mentioned here. He came of a surgical family, being, as he himself says, " conversant with chirurgery from my cradle, being the sixth generation of my own relations, all eminent masters of our profession." He was born in 1642, studied at St. Thomas's Hospital, of which hospital he afterwards became surgeon, and served during the Dutch War, in which he was severely wounded. John Browne was sworn Chirurgeon in Ordinary to Charles II. in 1677. He published in 1678, at London, " A Complete Discourse of Wounds, both General and Particular, as also a Treatise of Gunshot Wounds in General," based upon his experiences in the Dutch War. He also wrote on king's evil, on tumours, and on the anatomy of the muscles and glands. He was afterwards surgeon to William III. and died about 1700.

With regard to the progress of military surgery, Wiseman's teaching led the practice of the time. Flap amputations, at one time practised by the Roman surgeons, were re-introduced by Lowdham, an Oxford surgeon, in 1679. Von Hilden (1560-1634) introduced a form of tourniquet by placing a piece of wood under a bandage encircling a limb, and Morel, at the siege of Besançon in 1674, used the block tourniquet.

Translations.

EPIDEMIOLOGICAL OBSERVATIONS ON THE ANTITYPHOID CAMPAIGN IN THE SOUTH-WEST OF THE GERMAN EMPIRE.

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Detailed accounts of the origin and organisation of the antityphoid campaign in the South-west of the Empire have already been published. The campaign has furnished a number of statistical and epidemiological facts which are embodied in the following notes:—

Excluding the Bavarian Palatinate, the area in question had, according to the census of December 1st, 1905, a population of, roughly, 2,300,000 inhabitants, which was distributed among 2,352 communities, including

four large towns: Trier, Saarbrücken St. Johann, Metz, and Strassburg. Conditions also which were practically urban, prevailed in many parts of the districts of Saarbrücken, Ottweiler, Saarlouis, and Diedenhofen-West, owing to the highly developed industries in them. The districts of Merzig, St. Wendel, Saargemünd, Forbach, Diedenhofen-Ost, and the rural district of Metz, are industrial only to a limited extent, and resemble in their characteristics the remaining ones, which are purely agricultural and where the inhabitants are often in very poor circumstances. These districts have always suffered much from typhoid, and have not shared in that lessened typhoid rate which for more than ten years has been marked in the rest of the Empire.

In the four years, 1904, 1905, 1906, 1907, the total number of cases was 8,486, with a mortality of 859. The average annual number of cases was 9·3 per 10,000, the death-rate 0·93. The corresponding mortality rate in the whole of Prussia was in 1904 only 0·79, and in 1905 only 0·74. The number of infected communities in the four years was 1,050, or 41·5 per cent.

The four industrial districts had a typhoid rate which was not only absolutely very high, but also relatively far above the average. They contained 67 per cent. of the infected communities and 12·5 cases per 10,000 inhabitants. The two districts of Saargemünd and Forbach also showed very high figures, which are almost entirely due to their industrial areas. It is evident, therefore, that large centres suffer most from typhoid, not only absolutely, but also relatively, and through the ebb and flow of their population must be continual sources of danger to their surroundings.

The number of cases notified in 1906 and 1907 was 3,867.

The popular view that enteric is equally a disease of the rich and the poor does not appear to hold good for the area under consideration, as only 3 to 4 per cent. of the cases occurred among the well-to-do classes. In fact, it was almost exclusively the lower classes who suffered. The Army, with a percentage rate of 12 per 10,000, appeared to have suffered more than the average. If, however, the figures are compared with those of, roughly, the same age in civil life (20 to 25 years) it is evident that they are below the average, as in 1906 the civil population at those ages had a rate of 14 per 10,000 living.

Influence of Age.—The curve rises steeply up to 20 to 25, and then gradually and steadily falls. By comparing it with one showing the numbers of the populations at the various ages it will be evident that relatively, also, the ages 15 to 35 are the most dangerous ones. The number of cases among children is curiously small, forming hardly a third of the total. At first, in some parts of the area, it was found that children formed the majority of the cases, and it was thought possible that, as in malaria, they formed the chief carriers. This theory has not been confirmed. There can be no doubt, however, that in many chronic epidemics

children form the majority of the cases and frequently spread the disease, as owing to the mildness of the symptoms the cases are not recognised. The mildness of the attacks is also shown by the fact that their mortality was only 6·6 per cent.

As regards the mortality at the various ages, the figures generally increase in proportion to the age. After 50 years of age the average of 10·6 is more than doubled. These results correspond to observations made elsewhere.

Sex.—Both the rate of incidence and the mortality is greater among the male than among the female. The figures are as follows:—

	Male	Female
Rate of incidence	56·3 per cent. ..	43·7 per cent.
Mortality rate	51·8 ,, ..	48·2 ,,

While the men, however, form the majority of cases before 35, the women take the lead after that age.

Seasonal variations are the usual ones. The number of cases weekly rises at the beginning of the summer, reaches a maximum in the autumn months, falls gradually, and is at its minimum in the spring. These fluctuations were fairly regular in the four years, as there were no fulminant epidemics.

Number of Places Attacked.—This closely corresponded to the total number of cases. The increase of cases in summer and autumn can therefore be partly explained by the greater number of communities attacked. The fact that both curves show a rise at the beginning of the summer also points to a spread of the disease in the communities themselves. Summer and autumn, therefore, are the times when epidemics are more or less prevalent.

The difference in the number of cases in the first and second six months of the year is marked. The total number of cases is 8,486; of these, there are 3,013, or 35 per cent., in the winter and spring, and 5,473, or 67 per cent., that is, nearly double as much, in summer and autumn. The cause of this incidence in typhoid fever is not known.

Koch's theory that the typhoid patient and not soil and water is the nursery of the typhoid germ has been not only supported but also unexpectedly amplified by the observations of the campaign. Investigations determined not only that perfectly healthy persons may excrete typhoid bacilli, but also that the return to health of the typhoid patient by no means always means the disappearance of the germs from his body. These experiences have led to the definition of the typhoid carrier, and we may practically regard a bacillus excreter as the sole source of the disease. As it were the centre of a large number of concentric circles he radiates poison in every direction and infects all his immediate surroundings from which the germs again radiate further. If they meet a susceptible person a new case occurs.

Besides the specific germ three factors determine a typhoid infection, *i.e.*, the source of the poison, the carrier, and the receiver.

The source is, as shown above, always typhoid patients or typhoid carriers. The extent of their action is determined by various things. The social condition of the excreting person, his cleanliness, the sanitation of his surroundings, the virulence of the bacilli he passes, their number, and the way in which they leave him, all these factors must in every case influence the direction of the threatening danger in one way or the other.

The carriers or vehicles of the infection are the following: first of all the hands, then water, milk and other foods, personal linen and other clothes, toilet utensils, the soil, and the contents of privies and cesspools. By far the larger part of the germs, however, perish without causing a new infection and only a very small fraction find the suitable conditions for establishing themselves afresh in man. This is without doubt largely conditioned by the variety of vehicle in each case. Some of those mentioned above are rarely touched by man, others more frequently; some are in general use, others only used by individuals.

Most of the receivers of the poison show after the elapse of the incubation period the typical symptoms of typhoid fever. But, as mentioned above, there are quite an appreciable number who receive the germs without becoming ill. Only in a few cases could this immunity be proved to be due to a previous infection. This immunity is not necessarily permanent, as bacillus carriers may become ill months after the germ was first discovered to be in them. The general bodily health of the infected person has probably a good deal of influence as to whether immunity is present or not. Experiments on animals at least have shown that hunger and muscular work make the intestinal wall permeable to bacteria. The same predisposing circumstances, privations and hard physical work are found in man, principally in early manhood, and in war, and it is above all in war that typhoid fever has always demanded many victims.

If the three factors mentioned unite, so as to cause a new case, that case may in time and space be near or far from the original one. Typhoid bacilli as a rule do not live long outside the body, so that in most cases the difference in time is usually negligible. The distance in space from the original case, however, which the germ has covered, is of great importance. If the distance is but short and infection is carried by actual contact an immediate or direct infection occurs. If the germs, however, are carried by hands or boots, by food or personal linen, or by running water some distance from their source, before they once more find a nidus in man a distant or indirect infection takes place. These few remarks alone show the path of infection to be a most complicated one. It becomes still more complicated when it is remembered that cross-infections are possible, that both those who give and those who take are

not fixed in space but move about, and that finally many a source of infection is never discovered.

It is not to be wondered at then that it is rarely possible to discover with any degree of certainty the cause of any given case and both the vehicle and the source. Often the first factor cannot be discovered, often the second, and most often both are uncertain. If there is a possible source, possible both in time and space, it will seldom be wrong to make it responsible for the new case, even if all the links of the chain cannot be reconstructed. The contact with the vehicle is often so commonplace that enquiries covering weeks must be fruitless. Only as a rule can the vehicle be identified in those cases in which there are numbers of new infections from one vehicle or in which the vehicle on examination is found to contain the bacillus. In all other cases it can only be surmised and in no case can more be reached than a high degree of probability.

In the two years 1906 and 1907, a definite source and a definite vehicle at the same time could only be determined in 1,397 cases, that is to say, 36 per cent. (33 per cent. to 40 per cent.).

The typhoid patient was the source in 1,272 cases and the healthy typhoid carrier in 125 cases. The vehicles were as follows:—

Hands—personal contact	1,315
Milk	59
Other foods	22
Water	2
Personal linen	2

Typhoid patients may therefore be considered the chief source. This is due to their not only being more numerous than the carriers, but also to the fact that the germs passed by them have usually a higher pathogenicity. The infection was carried in most cases by the hands. In fact, if the hands of both the excreter and the receiver of the bacillus are taken into account, they probably had a share in every case. But they were not the sole vehicles. Food and utensils probably played a part in a good many of the 1,315 contacts. As their intervention, however, could not be identified and the possibility of personal contact was always present, it was assumed to be the cause though there really was not more than close contact.

In sixty cases the period of incubation could be determined with considerable certainty, in thirty-five cases it varied between five and forty-five days; the average was but little more than that found elsewhere. An epidemic caused through infection of a water main gave another opportunity of determining the incubation period. Of eighty-three cases infected 98 per cent. showed the first clinical symptoms in eleven to eighteen days.

In approaching the important question as to when a patient begins to spread infection, an incubation period of fourteen days may be assumed. The total number of typhoid cases may therefore be conceived as a long

line, the beginning of which is marked by the entry of the first typhoid bacillus into the body the end by the departure of the last from the body. The line itself may be divided into a number of equal sections each of which represents a week of sickness, and of which the first two belong to the incubation period. If the persons who in the course of the two years have become infected by typhoid patients are distributed among these sections, the picture is as follows :—

Incubation		Illness									
1st wk.	2nd wk.	1st wk.	2nd wk.	3rd wk.	4th wk.	5th wk.	6th wk.	7th wk.	8th wk.	9th wk.	10th wk.
18—15	84—66	104—83	87—71	58—58	16—43	13—21	7—15	9—5	9—7	10—5	5—3
33	150	187	158	116	59	34	22	14	16	15	8

This means in words that of the 812 infections which could be taken into account, 33 were in the first week of the incubation period, 150 in the second. In the first week of illness there were 187 infections; in the second, 158; in the third, 116; in the fourth, 59; in the fifth, 34; and in the sixth to tenth, 75.

The large number of cases of infection placed in the incubation period will be noticed at once and possibly objected to. Typhoid bacilli, however, have been repeatedly found in this period, and there is no real reason to doubt the possible infectivity of persons with latent typhoid. It must not be overlooked, however, that the great variations in the length of the incubation period open the door to many fallacies. For instance, if two persons in one family were infected with typhoid fever within seven days of each other, and the cause of the first case remained unexplained, the second case would probably be regarded as caused by contact with the first. It must not be forgotten, however, that it is at least equally probable that both cases were infected by the same unknown source. The incubation period then would have simply been in the first case eleven days; in the second, eighteen. Such considerations must make all calculations very fallacious. One important fact, however, they have furnished—viz., that the majority of the infections occurred before the beginning of the third week of illness. It would be a mistake, however, to conclude from this that the bacilli are more virulent in the first two weeks. The fact is that in the majority of cases the excretion of bacilli disappears with the clinical symptoms, and that many cases are cured in a fortnight and, therefore, cannot be infectious for more than two weeks. Also prophylactic measures are chiefly effectual in the later weeks.

The number of cases caused by bacillus carriers was comparatively so few that it would almost appear that as sources of infection they had but little importance. To answer this question they must be considered somewhat more in detail.

Up to December 31, 1907, the number of healthy bacillus carriers notified was 431. In some the germs soon disappeared again; in others

the condition became a chronic one. It appeared desirable to classify the carriers into temporary and chronic ones. The temporary carriers resemble bacteriologically the typhoid patient. Their body has received the germ, but gets rid of it in a short time. In the case of the chronic carriers the bacilli have found in the gall-bladder, or more rarely in the urinary bladder, a suitable nidus, from which they constantly pass out with the excreta.

If we consider all cases in which the bacillus has been demonstrated for at least three months, as chronic ones, it is found that of the 431 carriers, 211 were temporary, and 220 chronic, infectors. Both conditions may be consequent on an attack of enteric fever. This is the rule with the chronic carriers, whereas not more than half the temporary ones come under this heading. The high percentage of chronic carriers in women (80 per cent.) is remarkable, and is possibly due to previous damage of the gall-bladder by tight-lacing. In thirty of the chronic carriers cholecystitis was present. The age of the two classes was also markedly different. The temporary carrier was mostly young, the chronic usually old or middle-aged. This class contained also a large number of weakly individuals; among others, twenty-five lunatics. The conclusion may therefore be drawn that female sex, advanced age, and previously damaged health are the predisposing factors in the formation of a chronic carrier.

The excretion of the bacilli may last for years; in fact, we should be almost safe in assuming that many persons in whose gall-bladder the germs have once settled down will excrete bacilli for the remainder of their life. Of course, our actual observations were only for a short time. Of the 220 chronic carriers, 30 continued to pass bacilli up to six months, 55 up to a year, 64 up to two years, and 81 up to four and a half years. Among these carriers there were some whose condition had probably lasted much longer, as it may safely be assumed that it started with the previous attack of enteric. Thus 14 were probably carriers for four to ten years, 12 for ten to twenty years, and 5 for twenty to thirty years.

In forty-two cases the disappearance of the bacilli was notified after a persistence which in some cases had lasted years. But these results must be treated with caution. Our methods are not yet perfect, the bacterial excretion is sometimes intermittent, and finally there is always the possibility of other material having been substituted.

A *post mortem* was made on three of ten chronic carriers who died. The supposition that the gall-bladder was the breeding place of the bacilli was confirmed.

Since the beginning of the campaign the number of persons infected with more or less probability by the 431 carriers is 351. Of these 51 were infected by temporary carriers and 300 by chronic ones. It would appear, therefore, that the danger from chronic carriers is not so very great after all. On the other hand, many of the chronic carriers

are still unknown to us. Of the cases in 1906 and 1907, thirty-eight, or 1 per cent. of the total, became, as far as we can judge at present, chronic carriers. This would mean, allowing for the few real cures that the last twenty years are responsible for, 400 chronic carriers in the area, and probably there are a good many more. The possibility that unexplained cases may be due to chronic carriers cannot be negatived at once. Further, every infection by a carrier may be but the first in a long series of cases, in fact, one carrier may be responsible for a whole epidemic. The importance of the carrier must not, therefore, be underestimated. He is an important factor, and typhoid houses and typhoid areas seem to be his work. But he s much more difficult to pin down as a cause of infection than a patient confined to bed.

To return to the cause of the typhoid fever in the years 1906 and 1907. Besides the 1,397 cases for which source and conveyor may be considered as determined, there were 435 (219 to 216) in which only the source was identified.

These cases chiefly belonged to the epidemics of the two years which generally showed the same characteristic course. In some place which is usually rather insanitary, a family is attacked. Other cases follow, at first in the immediate neighbourhood, then in houses which are a little further away. Intercourse is often denied and a special channel of infection cannot usually be determined. It is therefore impossible to identify either conveyor or source. There can be no doubt, however, that previous cases are responsible for the present ones. The only possible assumption is then to postulate a chronic infection of the surface of the soil. Only in extremely favourable circumstances does a patient only infect his immediate surroundings; where there is a surface drainage typhoid bacilli will reach the street. They will be emptied out with bath water and washing water and they will leave the house with the urine which is emptied down the sink. We have, in fact, successfully identified the paratyphoid bacillus in a gutter in the street. The nearest house contained a case of paratyphoid whose chamber used to be emptied there. Typhoid bacilli, in fact, would probably be found in such places pretty often if, as in the case of human dejecta, the same trouble were taken to identify them there. Boots carry the germs from the street into other houses, or possibly children at their games soil their hands and so new cases occur. The more traffic there is in the street, the farther will the infection be carried. The rapidly growing young communities of the industrial districts nearly all have this surface drainage and it is probably one of the reasons for their high typhoid rates.

Such epidemics may spread widely, even beyond the boundaries of the town or village they started in. The mining village of Klein-Roseln in 1906 is a typical example. At the end of July the first cases occurred, then thirteen further cases in two houses followed on them, all of them were unrecognised till the middle of September. Further cases followed

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at first in the neighbourhood, then in other parts of the village. From the first week of November onwards eight other villages were attacked and not until the spring of 1907 did the epidemic die out, there having been ninety cases, fifty-three of which were in Klein-Roseln itself. The course of eleven other epidemics was practically identical.

Compared with these the fulminant epidemics caused by infected water or food are few. Apart from four small epidemics caused one by milk and one by infected food, in which last both source and vehicle were identified, there was only one small outbreak of twelve simultaneous cases which were shown to be due to an infected well, and even here it was impossible to determine how the well became infected, or even afterwards to find the bacilli in the well water. Nine further cases due to a joint of cold roast pork are the last of the 1,853 cases of 1906 and 1907 which can be more or less explained.

In 2,014 cases, or 52 per cent., neither source nor vehicle could be identified. In 173 of them there were clues, such as "drank unboiled milk" or "drank river water," but these are not explanations.

Nor can the knowledge that the infected person has been away from home be alone regarded as a sufficient explanation. There were 260 such cases, of which 58 brought the infection from foreign countries or other parts of the Empire. These adventitious cases caused, it was proved, 48 further infections, so that 106 cases in all may be considered as imported. How many were exported from our area is not known, probably a considerable number. The 202 cases imported from other places in the area were not carried far. Figures do not show the great industrial centres to be a great danger as one would expect. Forty-five cases were proved to have been introduced into large centres, with 7 cases following on them, while but 41 persons coming from other parts were infected in them, with 10 cases consequent on these.

After these remarks, the characteristics of the typhoid curve may be discussed. The curve falls at the beginning of the cold weather. People begin to lead more of a home life and thus become less exposed to infections which may be picked up outside. Only for infection by contact are the winter conditions more favourable. And, as a matter of fact, infection by contact does not diminish in the winter, but keeps at a high rate, and in 1907 even caused a late rise, which though unable to stop a fall as a whole, left the curve at its lowest point at the beginning of the warm weather. People now begin to come out of their houses, and both infectious and susceptible persons come more into contact with outdoor things. Fæces are more often deposited in the open and are placed as dung on the fields. More water, often of a doubtful character, is drunk the warmer it gets. Open-air bathing begins, raw fruit and vegetables are eaten. Flies also may begin to spread infection. Bowel troubles make susceptible persons more susceptible. Spring is a transition stage. Owing to the previous cold weather the possible sources of infec-

tion have become less and the new summer factors are not yet in full swing, and infections by contact rather diminish. In the summer all the factors, except perhaps immediate contact, are in their fullest vigour and rapidly swell the figures.

Of the cases in 1906 and 1907, 307 were paratyphoid and have been included in the total. Of these only three were caused by paratyphoid A, all the others belonged to paratyphoid B. The cases were more or less generally distributed, although the Trier district with 168 cases and the principality Birkenfeld with 18 cases were relatively more severely affected than Lorraine and Lower Alsace. The curve of paratyphoid is much the same as that of typhoid, and it has much the same epidemiological features, except that it is not so much given to chronic epidemics. The etiology of paratyphoid cases is even more complicated than that of typhoid, but cases due to personal contact have been more or less proved, and carriers also do their share. Of our chronic carriers twenty-nine were paratyphoid, of the temporary ones sixty-eight. Food is apparently the favoured vehicle, *e.g.*, in the epidemic mentioned above caused by pork, it was paratyphoid bacilli which were found. The mortality was 4·2 per cent. Still new knowledge seems to point to the necessity of drawing epidemiologically also a sharp line between typhoid and paratyphoid. It appears certain on the one hand that paratyphoid can also flourish in the domestic animals, *e.g.*, pigs, which may thus be sources of infection, and also the germs seem to grow freely in suitable vehicles. There is a marked difference here from typhoid.

Antityphoid measures may be direct or indirect. The former are directed against the sources of infection, the latter strive to render the vehicles of infection harmless.

The first thing among the direct measures is to discover the sources of infection, *i.e.*, the typhoid sick and the typhoid carriers. Here the authorities are above all dependent on the notifications of the local practitioners. The investigations made in connection with each case of themselves increased the numbers notified by practitioners, but beyond these the investigations by medical officers of health and public institutes alone succeeded in 1906 in discovering one-sixth and in 1907 one-eighth of the total number of cases. Very often inspecting a village would reveal five or more cases close to the originally notified one. This was especially the case when the community in question had been clear for some time previously.

Finally, 103 old cases and 296 bacillus carriers were discovered by the Commission in 1906 and 1907. The old cases were simply discovered by the fact that they were causing new infections. As, however, before our prophylactic measures began only about one case in five could be proved to cause new infections, we may assume another 400 to 500 cases which remained undiscovered, simply because they gave rise to no new infections. To these must be added the undiscovered bacillus carriers.

How important it is to discover early a possible source of infection is shown by the fact that of the 1,397 cases whose origin was more or less determined, 137 were derived from the 103 old cases just mentioned as discovered afterwards, 47 from hidden carriers, and 912 from sick, who at the time of causing infection had not yet been brought under supervision. For the time that passed between the commencement of illness and the commencement of prophylactic measures was usually fourteen to sixteen days. It is true routine disinfection usually started on the ninth to the twelfth day, but it was more or less nominal until the official inspection. The date of removal to hospital also when it occurred at all was usually the tenth or eleventh day. Still the sick taken into hospital had time before their removal to infect 405 other persons, *i.e.*, 32 per cent. of the total number proved to have been caused by sick.

Chronic carriers who had been told to take precautions caused 78 infections. Their isolation is of course impossible unless they are persons under confinement for other reasons, *e.g.*, lunatics. Routine measures carried out by themselves even in the best of cases cannot be relied upon. The discovery of a cure is the only possible safeguard against them.

The general organisation of the preventive measures gradually improved with experience, the interest of the public, and still more of the local practitioners, was awakened, and their co-operation became more and more generous. Of the cases in 1906, 91 per cent., and of those in 1907, 92 per cent., could thus have the diagnosis clinched by bacteriological methods. Improvements were also made in laboratory methods.

The working of disinfection was much improved by appointment of district disinfectors. As home isolation is seldom satisfactory, permission for removal to hospital was always applied for. In urban populations there was usually no difficulty, in rural ones there was great difficulty, especially if the nearest hospital was far away. This led to a multiplication of cottage hospitals. In 1906, 1,019 cases, or 51·2 per cent., were removed to hospital, in 1907, 936, or 53·7 per cent. The mortality was 10·2 to 10·1 per cent., somewhat under the average. Prognosis is therefore not made worse, even by often a lengthy journey to hospital. Of the cases remaining in the home it was often possible by the provision of trained nurses to more or less ensure the carrying out of the proper precautionary measures. Large sums were also spent on improving the general sanitation of the country.

As to results: the time immediately before the commencement of the campaign is not a good one to select for comparison, as owing to want of organisation there were probably many unreported cases. This would explain also why the commencement of the campaign showed an apparent rise in the numbers. It will therefore be more profitable to compare the last four years.

In the districts under the Imperial Commissioner there were in

1904	2,567 cases with	235 deaths.
1905	2,052 ,,	215 ,,
1906	2,080 ,,	220 ,,
1907	1,787 ,,	189 ,,

In the whole area including the palatinate there were in

1904	3,491 cases with	317 deaths.
1905	2,625 ,,	270 ,,
1906	2,473 ,,	244 ,,
1907	1,979 ,,	215 ,,

In the fourth year the number of cases thus was less by 1,500, or 43 per cent., the number of deaths by 192, or 32 per cent., than in the first year. (In 1908, up to December 27th, the number of cases in the Imperial Commissioner's area was 1,452, in the total area 1,666.)

Some of these results may be accidental, as here before the time of the Commission, and also elsewhere the figures now rise, now fall, but a large part of the diminution may fairly be put to the credit of the Commission, if we remember alone the millions of bacilli which could have caused fresh infections which have been cut off at their source by it. In 1906 and 1907 the number of infections which occurred after the preventive measures had taken hold was only 204 as compared with 1,049 which occurred before the measures began to be carried out.

The general height of the typhoid curves is also lower. This means that the Commission has been able to successfully combat typhoid fever even at the season of its greatest prevalence. The following makes it even clearer:—

	Jan.—June		June—Dec.
1904	945	..	1,622
1905	645	..	1,407
1906	754	..	1,326
1907	669	..	1,118

It is noticeable that the diminution is not due so much to an effect on the close contact cases as on a lessening of the unexplained cases, the indirect infections. The community as a whole, rather than the individual, has therefore scored.

There was in 1906 an increase in the number of affected parishes, but there was no corresponding increase in the number of cases. The figures per infected parish were in 1904, 4·88.

1904	4·88 cases with	526 affected	parishes.
1905	4·49 ,,	457 ,,	,,
1906	4·36 ,,	475 ,,	,,
1907	4·02 ,,	445 ,,	,,

Nine districts showed no lessening in the number of cases, in 21 there is a diminution, which in 8 of these is one of 50 per cent. and more. Still more convincing are the figures for larger districts. They have gone down in the district (Regierungsbezirk) of

Trier	from 1,116 to 872,	*i.e.*, from 12	per 10,000	to 9·2
Lorraine	,, 827 ,, 504,	,, 13·4	,,	8·2
Lower Alsace ..	,, 580 ,, 355,	,, 8·4	,,	5·2

Reviews.

The Strategetical and Tactical Employment of the Medical Service as carried out in an Army Corps. By Maximilian, Ritter von Hoen; translated by Lieutenant-Colonel W. G. Macpherson, C.M.G., R.A.M.C. Published for the War Office by Harrison and Sons. Price 4s. 6d.

Ritter von Hoen, the author of this work, is a Lieutenant-Colonel of the Austrian General Staff and a Lecturer at the Army Medical College in Vienna. He is, then, a staff officer who has paid special attention to the working of the medical service.

Lieutenant-Colonel Macpherson has translated it in a way that is all that could be desired; he has also added a very necessary introduction explaining shortly the organization of the Austrian Field Army, and, in more detail, that of the Field Medical Service, explanations which are repeated in footnotes where necessary. These organizations differ from ours: the brigade is a larger unit containing six to eight battalions; the Field Medical Service is built on very different lines. Yet, as pointed out by Lieutenant-Colonel Macpherson, the study of the problems involved in the use of the organization will help to the development of the theory and practice of the use of our own system, which has become of the greatest importance since our Army no longer is organized only for "the punitive expeditions against troublesome savages, or the marches to relieve garrisons cut off by some sudden outbreak of rebellion which it dignified by the name of wars" ("*Times* History," vol. iii., p. 550), but as a possible partaker in a larger conflict.

The principles of employment of any medical service in war are simply stated in the two following propositions: the rapid removal of the sick and wounded from the fighting line, and the return of every man to that line as soon as he has become efficient. The first of these is explicitly stated by Lieutenant-Colonel Macpherson; both are accepted as the twin bases of the Austrian system.

Although the only literal manifestations of the Teutonic origin of this book in the translation are found in the place names, technical terms, the use of the words "in battle" for "in action," and a curious erratum, yet were all of these eliminated, no one could doubt its nationality. It has the defects of its qualities: very thorough, very complete, the enormous mass of detailed instruction blurs the general view and renders its study apparently difficult. Yet a little perseverance enables one to see the commonsense of the whole of these instructions, many of which, indeed, are so obviously necessary that their introduction can only be regarded as the logical filling up of a larger outline.

The Austrian Field Medical Service has no unit which corresponds exactly to ours. It works on principles which in some respects differ from those which we have been able to put in practice. These differences are: the employment of the temporarily unfit and convalescents (massed as "convalescent companies") in various links of the chain; the classification of the wounded from the first by degrees of severity; and the employment of local possibilities—*personnel*, accommodation, transport—as an integral part of the system. We used convalescents in South Africa,

but as an expedient, not entirely successful: our attempts at the utilization of local aid, always experimental, were not always encouraged or even permitted. One principle we have in common: the use of *personnel* from one unit to reinforce or even form another, in our case as a temporary non-regulation expedient, but in any case a method of doubtful benefit, and only to be permitted because of the universal difficulty that "military and financial considerations" will allow only of a "limited provision of medical resources." No medical service will ever have as much *personnel* and transport as it need to carry out its work, without temporary expedients of some sort.

In the Austrian Service the bearer division of our field ambulance is represented by the united regimental stretcher-bearers, with wagons from the divisional unit. From the first line of assistance, the slightly wounded go to the "lightly-wounded section" of the divisional unit, thence to a field convalescent depôt. The more serious cases go to the dressing-station section of the divisional unit (where further classification is made), with which is always associated its ambulance section. Apparently the dressing-station section undertakes all the surgical work, while the ambulance section is devoted to the accommodation, feeding, and nursing of the cases so long as they are there, which may be, in the case of those unfit for transport, some time—probably till taken over by the mobile reserve hospital. There appears, then, a possibility of the ambulance section being immobilised while its corresponding dressing section is of course empty and free. The dressing station can also evacuate to the "lightly-wounded section," and to the field convalescent depôt (placed close to it) on the one hand, or, on the other, through the rest stations, of different types to the evacuating station, railhead, and so on. The lightly-wounded section and the field convalescent depôt should normally evacuate to the front—a highly desirable method. Thus, *during an action*, the chain is through first line to dressing stations and ambulances and the lightly-wounded section. *After the action* the field hospitals (three sections of 200 "beds") advance to receive the mass of wounded with whom it has not been possible to deal during the action. Behind this line, or rather zone, of dressing and ambulance sections and field hospitals, come the mobile reserve hospitals and mobile rest stations, which, with the field convalescent depôts, clear the advanced hospitals and restore them to their normal condition of emptiness. The system of road transport by ambulance wagons (two sources), country carts, and empty supply wagons, associated with the rest stations of several types, forms a very complete organisation.

One good point is the employment of the mobile reserve hospitals for the reception of the sick in the area of concentration—one for each army corps, while the other remains ready to follow up the army corps, to be in a position to relieve the field hospitals, &c., as described above. This reservation of the field hospitals for the actual reception of wounded from an action is a very good point: it fulfils the essential that some hospitals, at least, shall be empty and available for distribution. Very important, too, are the arrangements by which varying numbers of field hospitals are kept under control of the army corps headquarters (or of army headquarters if more than one corps is operating), while in other conditions more latitude is allowed to subordinate commanders. Indeed, the strategetical portion is probably the most instructive, though it does not seem easy to follow out the same lines with our organisation.

It is of course, obvious, that the Austrian organisation of the medical service in the field contemplates contingencies which we have not faced since (except to some extent in the Crimea) the beginning of last century. The most striking impression one gets from reading this book is not of any essential difference in aim, but of an absolutely different outlook, and that is a political question.

The system looks on paper a little complicated; the borrowing of *personnel*, carried out to the extent contemplated, is perhaps dangerous, and one doubts how far the scheme would be consistent with the actual conditions of war. For example, the rail transport—an important feature—would apparently need a clearer line than could always be expected. It is doubtful, too, how far the numerous details are suggestions, or whether officers would be expected to follow them in practice. There seems to be too great a tendency to lay down rules for conduct in every possible case, and too little is left to the individual judgment, so that the result as set forth seems to form an exceedingly inelastic body of doctrine, while it is above all things essential that adaptability to circumstances should be preserved.

The wider outlook, the acceptance of heavy loss and of serious hardship as a necessary part of war is seen throughout the volume, as, for example, where it is said that in evacuation by road under unfavourable conditions "the seriously wounded may remain in the wagons, and the most that can be done is to shelter them during inclement weather by bringing the wagons into sheds." This demands a different public.

The problems are useful—they are somewhat imposing in form; but the contrast between the dignity of the heading and the substance below it is occasionally almost absurd. The Principal Medical Officer's "appreciation of the military situation" is, more usually than not, a very brief note of the points in the orders received which are necessary for working out his own orders—probably most usually done in practice by underlining the important parts with a common red pencil, hardly an "appreciation." The working out of these problems is useful as a means of impressing principles and details on the memory. There appear to be certain differences in the detail of staff work as compared with our own service.

We have to thank Lieutenant-Colonel Macpherson for making a very useful book available to us all, useful as suggesting modes of employment of our own organisation, if it be read with understanding and a judicious neglect of detail, which is not necessary for its proper comprehension. Pages 39 to 43 may be specially referred to as giving a general view of the system. But the multitude of detail (much of it of little value outside the Austrian service), and the want of elasticity referred to above, make it rather strong meat for the babes and sucklings of the Corps, or, indeed, for those without practical experience of work in the field.

R. J. S. S.

House-Drainage, Sewerage and Sewage Disposal in Relation to Health. By Louis C. Parkes, M.D. H. K. Lewis. Small 8vo. Pp. viii., 142. Price 2s. net.

This brochure contains the lectures delivered at the University of London in February, 1909, under the Trust created by the will of the late Sir E. Chadwick in 1895. The lectures were four in number, falling

under the following titles, namely, (1) "The Causation of Disease by Excretal Refuse," (2) "Conservancy Methods of Excreta Removal," (3) "Modern Methods of House-Drainage and Sewerage," and (4) "The Disposal of Sewage." Few men in the Public Health Service are more competent to discuss these questions than the author, and a careful perusal of these lectures shows that Dr. Parkes has thoroughly covered the whole ground, and discussed the various controversial aspects of a notoriously difficult subject with conspicuous fairness. In fact, the great merit of these lectures is that there is no attempt made to focus attention upon any one particular method. The scientific facts bearing upon the causation of disease by excretal refuse are adequately reviewed, and the respective merits and demerits of various attempts to deal practically with the problem are most impartially discussed. In no part is this more apparent than in the section dealing with the disposal of sewage—a field of sanitary effort which has unfortunately been the storm centre of empiricism, commercial rivalry, and scientific investigation. Fortunately, we have now reached a time when many of the details which formerly confused this question are thoroughly understood and appraised at their proper value. We can now see things in their true perspective; for this, we owe much to the Reports of the recent Royal Commission on Sewage Disposal, and for an eminently readable and judicious review of the whole question we recommend this series of lectures to all interested in public health administration and work. R. H. F.

MEDICAL INSPECTION OF SCHOOLS. By A. H. Hogarth, M.B.Oxon., &c. Oxford Medical Publications. Frowde and Hodder and Stoughton, 1909. Price 6s. net.

This compact and well-printed manual of 350 pages has been brought out opportunely. All over the country medical inspection of school children is being carried on by practitioners more or less inexperienced in the methods employed, and more or less unacquainted with the objects that are sought to be attained. Dr. Hogarth has clearly and succinctly summarised all the information that is needed by anyone called upon to act as medical inspector of school children; the book will also be most valuable to school managers, and all interested in educational health matters. Since April, 1908, army medical officers have had to perform these inspection duties in army schools, and to them Dr. Hogarth's volume will be most useful.

The first six chapters are introductory, presenting a sketch of the history of the subject, the progress of inspection of children in various European States, and the legislation that has been gradually brought about. It is interesting to be reminded that, as far as our own country is concerned, the whole system of school inspection is the outcome of a recommendation in the report of the Interdepartmental Committee on Physical Deterioration (1904), which Committee was appointed largely as a result of the issue of Director-General Sir William Taylor's Memorandum, calling attention to the inferior physique of the recruits that presented themselves at the time of the South African War. Austria was the first country to legislate effectively for school inspection in 1873; France followed in 1884, and then Argentine, Norway, Sweden, Japan (1898), Switzerland, Germany, the United States, Russia and England

(1906 and 1907). Somewhat earlier, in 1905, the Education Committee of the London County Council had made a commencement by employing part-time medical inspectors and nurses to examine children in the elementary schools; the scheme was only tentative, but "the results clearly justified the experiment; and the reports of the medical officer were the basis on which the details of the first official memorandum issued by the Board of Education to local authorities were prepared" (p. 33).

Probably no one now hesitates to allow that medical inspection of school children is necessary; the plain fact is that every school contains some proportion of children suffering from physical defects, which have not been recognized, but which, if recognized, might be treated with, in the mass, an immense improvement to the health, happiness, and wellbeing of the sufferers; it is a matter partly of philanthropy and common humanity, and partly of pure utilitarianism from the point of view of political economy. One may base the need for medical inspection on either ground; taken together they afford unassailable justification for the expenditure of public money with assurance of adequate return to the wealth of the State. Dr. Hogarth affirms that 80 per cent. or more of the children suffer from defective teeth, 50 per cent. are affected with vermin or other parasitic conditions, 20 per cent. with defective vision, "and that 10 per cent. are retarded in their educational progress by physical defects such as anæmia, general debility, and deafness resulting from adenoid growths or discharging ears" (p. 40). The figures may not be exact, but the general inference is sound. It requires little imagination to picture the miserable future that lies before these unfortunate ones in the ever-increasing competition for employment, and the earning of the bare necessities of life, that now exists in all our large centres of population. If parents were able to recognise these faulty health conditions, and if they did their duty in attending to them when recognized, medical inspection would not be necessary; as things are, a large proportion of parents do not know that anything is wrong, and amongst these a great many do not care. In the army, probably the standard both of knowledge and of care in regard to children's defects is higher than amongst the population generally, but we are not aware of any statistics bearing on the matter at present available.

The author rightly lays down that "What is needed is not so much statistics of height, weight, and chest measurements—desirable as these are from a scientific point of view—but exact knowledge of the conditions which lead to general physical degeneration, defective teeth and eyesight, epidemic disease and consumption" (p. 45). When this is obtained, efforts must be made "to improve the general standard of health and physique of the children now at school, and so, as a result, of the next generation. This is one of the first principles of the science of eutrophics, which for the moment wins more general approval than the more drastic methods of eugenics" (p. 46). To take one instance, defective eyesight: Wright Thompson, from his examination of Glasgow children, concluded (1) that it is largely preventible; (2) that town children have less acute vision than those who live in the country; (3) that those in the poorest quarters are most affected; and (4) that visual exercises may be undertaken at school to increase sharpness of distant vision. Again, the author states that about 10 per cent. of the school children in crowded districts "are suffering from remediable diseases and ailments of such a kind as to hinder their educational progress to a serious extent. These children

cannot be dealt with by the teachers, nor do they receive attention from their parents; . . . . can there be any doubt of the substantial advantages ensured by transforming 10 per cent. ailing and backward children into receptive children of ordinary intelligence, worthy of the time and trouble which the teachers spend upon them?" (p. 53). The advantage to the State is summed up as twofold: "(1) The results of educational efforts will be enhanced not only by increased attendance and educational efficiency, but also by a more systematic and scientific grouping of the children, and by adapting school methods to the needs of the children; (2) the physical condition of the children and of the nation generally will be improved" (p. 56).

As to how far the medical inspector should criticise and condemn unsuitable school buildings, the author takes a very reasonable ground: he says, "from the sanitary point of view systematic medical inspection, while bringing to light obvious and gross defects not necessitating extensive structural alterations, should from the first be more especially directed to the instruction of teachers and school-keepers as to how they can make the best of their present unsatisfactory surroundings" (p. 59). This advice is particularly applicable, in our opinion, to army procedure; defects of course must be pointed out, but the chief thing is to make good use of existing conditions, and advise as to what improvements are practicable. Great improvements all round have been effected in recent years; there has been a general levelling up; and if this is steadily continued the results will be satisfactory; hardly ever perhaps can all that is needed be provided everywhere at once (although this is sometimes expected by the enthusiastic sanitarian); but if the progress is in the right direction, and the best use made of what is available, we may be thankful, even if not satisfied.

Another important point made is, that although the school is commonly considered to be a centre for dissemination of infectious diseases, it should rather be "regarded as a convenient place for controlling their spread" (p. 60): contact infection is limited in school, while there are no means of controlling street play, or the intimate contact of small children at home. There is also a large group of communicable diseases, chronic in duration, and for the most part diseases of childhood, which have been hitherto almost entirely neglected by public health authorities; such are ringworm, verminous and parasitic conditions, skin diseases, and ophthalmia and other diseases of the eye. By the labours of the school medical authorities, as well as of the medical officers of health, these conditions have been recognised and are in process of being controlled. It must be admitted that "one of the first functions of any system of health inspection must be to get the children clean and free from parasitic and contagious diseases"; even if nothing else resulted, the gain to the public health would be immense. But this is not all: the children are being taught the elementary habits of cleanliness,—the use of the pocket handkerchief, the habit of nasal breathing, the cleansing of the teeth; "in a word, they must be taught to live healthy and cleanly lives." The change for the better that has already taken place, within the last few years, is fairly obvious to anyone who chooses to look for it; the gain in self-respect that ought to, and does, accompany these improved habits—among which may be reckoned the now almost universal cult of the (*longo intervallo*) Eton collar—is associated also with a decided improvement in the manners of the

children. Nor is the improvement confined to them: it spreads to their home and their parents.

The next seven chapters deal with the practical working of medical inspection, the duties, qualifications and methods of the school doctor and school nurse, and the organisation of school hygiene. The conditions and requirements of large towns, of small towns, and of country districts are discussed separately. Chapter x. deals with the duties and qualifications of the school doctor. These are summarised as follows (p. 144):—(1) Each school in his area should be visited as a matter of routine once a week or once a fortnight for general purposes. (2) Each department (boys and girls) should be visited once a year for vision testing of selected children; and each department (including infant schools) once a year for dental examination. (3) Each class should be visited once or twice a year for general inspection and for supervision of special children. (4) Lastly, each child should be inspected three or four times, at stated intervals, during its school career. Further, the school doctor must supervise the work of the school nurse, investigate outbreaks of epidemic disease and give lectures to teachers. He should also get into touch with the Health or Care Committee of each school, and occasionally be present at conferences of the teachers and parents.

Administrative routine is sketched out in chapter xiii.; one small point may be criticised. It is recommended (p. 158) that a numerical scale should be used for expressing various conditions found on examination, *e.g.*, nutrition may be noted as from 1 to 5, "excellent muscular development" being styled 1, and "very thin" marked 5, *i.e.*, 1 is "first class" and 5 is the worst. On page 165 a numerical scale is given for mental development, ranging from ½ to 5: here "mentally defective" children are marked as ½ if of low grade, 1 if of middle grade, and 1½ if of high grade; a very dull child is 2, an average child 3, and a very intelligent child—the highest in the scale—is 5. It is not logical, and may certainly lead to confusion, if in some scales of notation 1 represents the best, and 5 the worst; while in others the numbering is reversed. Perhaps it does not much matter which is used, but we prefer the ascending scale, as being the most natural, extending in ordinary cases from 1 to 5, with 3 as the middle term; thus excellent = 5, good = 4, normal, or average (or fair) = 3, bad = 2, very bad = 1. There may be some uncertainty as to whether the *average* of any series of observations is the *normal*; but this cannot be obviated. What appears certain is that there should be the same number of degrees above, as below, the middle term (*i.e.*, the number of terms should be five or three—not as in one scheme four: good, normal, below normal, bad); and that *all* scales should be either ascending or descending, and not some marked 1 to 5, and others 5 to 1. We prefer the ascending scale, the highest figure denoting the best condition.

Dr. Hogarth considers that fifteen children may be examined, so far as regards their physical condition, in an hour, *i.e.*, four minutes to each child. This seems to be a very meagre allowance, and certainly does not allow for any personal communication with the parent, which (whether in regard to family medical history, or to the future management of the child) we believe to be of considerable importance; an allowance of ten minutes, and in some cases twelve minutes per child, does not seem to be excessive. *Festina lente* is a better maxim than Macbeth's. The

card recommended by the Board of Education [1] is considered to be too complicated—as the author delicately puts it, "it serves the useful purpose of reminding the doctor that nothing should be forgotten." A form of card is suggested on pp. 167-8, which, however, makes no mention of examination of the heart or lungs; even if only one case of rheumatic or chronic heart affection were discovered in a thousand examinations, we think it would be worth while to spend the few seconds required in drawing blank the remainder.

Chapter xiii., describing a system of administrative routine, based chiefly on the practice in London, is extremely useful. The last three chapters (xiv. to xvi.) deal with Medical Treatment at School, the School Clinic, and Common School Diseases. The present condition of things in London is not looked on with much satisfaction. While in Switzerland about 90 per cent. of the children discovered to be defective actually seek advice and obtain treatment, in London "it has been found that only about one-third of the children reported to their parents to be suffering from markedly defective vision seek advice of any sort, and even of these the majority do not obtain any remedial treatment. The same percentage holds good for children suffering from chronic ear disease. . . . The result is that in London and other large cities probably not one-tenth of the defective children are adequately treated or materially benefited. Hence it is clear that more than half the labour and expense of medical inspection is thrown away" (p. 211). With the arrangements now made, or in course of being made, for treatment, it is hoped and expected that this will be altogether changed; we believe that much influence may be exerted by personal interview with parents at the time of examination. As to the importance of ringworm, it is stated (p. 215) that "twelve schools taken at random in various parts of London lost 26,766 attendances through ringworm—an equivalent of the ordinary attendance of nearly 3,000 children, earning a total grant of more than £5,600 per annum" (p. 215). It is probably not generally known that "at least half of the elementary school population have been infected [with lice] at some time or other—a disgrace to our civilisation. Nor does it seem credible that any of H.M.'s inspectors could pass a school as satisfactory and efficient in which more than half the children were verminous" (p. 218). But probably the inspectors would say that their inspectorial duties were concerned solely with the products of the children's brains, and had nothing to do with the occupants of their scalps. As regards teeth, 400,000 London school children require dental treatment, and for half of this number the need is urgent (p. 220). About 20 per cent. of the children of school age suffer from defective vision; in London not more than one-third of this number seek any kind of advice; fewer still procure the necessary glasses. Dr. Hogarth comes to the conclusion that the only solution of the problem lies in the establishment of school clinics for treatment of the children, under direction and control of the Education Authority: "Without the school clinic the whole system of medical inspection becomes practically fruitless; with it, there is opened up the possibility of incalculable benefit to the future citizens of the State" (p. 258).

The last chapter deals with Common Diseases of School Life, and a

[1] This is Army Form C 319, which also has two additional items.

useful appendix gives a bibliography and various extracts from official documents. This book is to be thoroughly recommended to all medical officers called upon to inspect school children, and we congratulate Dr. Hogarth on the production of such a sound and comprehensive piece of work. A. M. D.

Current Literature.

The Cultivation of Bacillus Lepræ. By M. T. Clegg (*Philippine Journal of Science*, vol. iv. No. 2).—Believing that the leprosy bacillus derives its nutrition from the products of the tissue cells in the lesions in which it is encountered, attempts were made to grow it in symbiosis with amœbæ. In order to procure a suitable growth of amœbæ a culture medium, containing agar 20 gr., sodium chloride 0·3, extract of beef, 0·3, sterilised in the ordinary manner, and having a reaction 1 per cent. alkaline to phenolphthalin, was poured into Petri dishes and allowed to harden. The material containing the amœbæ was then spread in a thin layer over the agar, and if proper symbiotic bacteria were present the amœbæ developed within two to ten days. A culture of amœbæ was obtained from a dysentery stool, and after a sufficient growth had been obtained the surface of the media was smeared with a portion of the pulp of a leper's spleen. Microscopical preparations were then made from the cultures and stained with hot carbol fuchsin solution, decolorised and counter-stained by Gabett's method. A great number of leprosy bacilli were found to be present, together with short, plump, acid-fast bacilli, occurring mostly among the clumps of the leprosy bacilli and associated closely with the amœbæ. Those organisms which, from their morphology, were evidently leprosy bacilli, were undoubtedly carried over from the original source, that is, from the spleen. Transplants from these plates were immediately made on fresh plates, containing amœbæ and their symbiotic organisms, and incubated for two days at the same temperature. Slides were then prepared from this series of cultures and stained in the same manner. Microscopical examination showed that the short, plump, acid-fast bacilli had increased in number, showing conclusively that the organism was multiplying. Control plates made at the same time, with the same amœbæ and in the same manner, except without the material from the leper's spleen, showed no acid-fast organisms.

Similar acid-fast organisms were grown from a second fatal case of leprosy. Clegg states that although the acid-fast bacillus differs from the leprosy bacillus in morphology, nevertheless it may be that organism, as we know nothing regarding the morphology of *Bacillus lepræ* on artificial media.

Clegg proposes to investigate the properties of the acid-fast organism growing in symbiosis with amœbæ and a well-known species of bacteria, such, for example, as the cholera spirillum or the typhoid bacillus. In this manner, if the leprosy bacillus produces colonies, it should be possible to differentiate them from those of the cholera or typhoid organisms (constituting the symbiotic bacteria), whose characters are so well known.

In a supplementary note Clegg states that he has obtained a growth of a similar acid-fast organism from leprous nodules in the ear of three living subjects. He now omits beef extract from the media, and says that repeated inoculations of the leprous material on the media containing amœbæ is necessary in most cases, in order to produce a primary growth of the acid-fast bacillus.

Further Observations on Fowl Spirochætosis. By Andrew Balfour (*Journal of Tropical Medicine and Hygiene*, vol. xii., No. 19).—A *résumé* of the work on this subject, accomplished up to the summer of 1908, appeared in the "Third Report of the Wellcome Research Laboratories." During the winter of 1908-9, and the spring following, the research was continued, and in this short paper are recorded some new and interesting developments, which are of great interest in view of Leishman's work on the remarkable changes apparently undergone by *Spirochæta duttoni* in *Ornithodoros moubata.*

Balfour has now shown that:—

"(1) Ticks (*A. persicus*), either as larvæ, nymphs, or adults, fed on chicks with acute spirochætosis, exhibit the peculiar chromatin granules first described by Leishman in the case of *O. moubata*, fed on blood containing *S. duttoni*." The granules are found in the ovaries, eggs, oviducts, alimentary diverticula and salivary glands of the ticks, but more especially, and in greatest number in the Malpighian tubes.

"(2) Chicks inoculated with an emulsion of crushed larvæ showing these granules, but no spirochætes, develop acute spirochætosis. The same is true of birds inoculated with the tissues or eggs of ticks containing these granules."

Balfour admits that it was Leishman's work which led him to look for the chromatin granules in the tissues of infected ticks, and says, "There can be little doubt that Sir W. B. Leishman has thrown fresh light on the complex question of the life-cycle of spirochætes, and the *rôle* played by ticks in spirochætal fevers."

The Treatment of Asiatic Cholera during the recent Epidemic in Manila. By Henry J. Nichols and Vernon L. Andrews (*Philippine Journal of Science*, vol. iv., No. 2, p. 81). **The Treatment of Cholera by Injections of Hypertonic Saline Solutions with a Simple and Rapid Method of Intra-abdominal Administration.** By Leonard Rogers (*Philippine Journal of Science*, vol. iv., No. 2, p. 100).—An epidemic of 885 cases of cholera occurred in the City of Manila during August, September, and October, 1908. Of the 885 cases 579 died, 298 were found dead, and of the 587 cases discovered while alive 466 were treated in hospital, with a mortality of 50 per cent.

Collapse and uræmia were the two essential conditions requiring treatment. In the first part of the epidemic only stimulants, such as strychnine and digitalin, were used for collapse, later subcutaneous injections of salt were introduced, and still later intravenous injections came to be the routine treatment. The following table gives the tota results :—

Method of treatment	Number of		Mortality
	Cases	Deaths	
			per cent.
Stimulation	145	47	32·4
Subcutaneous injection	175	117	68·8
Subcutaneous and intravenous injections	36	19	52·7
Intravenous injection	94	41	43·6

Under the heading of stimulation all the mild cases are included, so that the mortality appears small. As a method of treatment of severe collapse it was recognised to be of the least value.

The number of recoveries in the cases treated by the intravenous method was 25·2 per cent. greater than in those treated by the subcutaneous method. This apparent superiority was not due to a diminished virulence of the disease, as the general mortality in the City in the last part of the epidemic was only 5 per cent. less than that in the first part. The salt solution (0·85 per cent.) employed in the intravenous injections was sterilised in 1- and 2-litre bottles. When a bottle was to be used the cork was loosened, and the bottle heated in a hot-water bath to about 43° C. A two-way rubber cork with one long glass tube, for the admission of air, and a short one, to which a piece of rubber tubing was attached, was firmly inserted into the neck of the bottle immediately after the withdrawal of the original cork; the bottle was next inverted in a rack and the solution allowed to run from the tube until warm. For insertion into the vein, a medium-sized hypodermic needle or a canula was attached to the rubber tubing. Usually the long saphenous vein, just above the internal malleolus, or sometimes one of the veins of the arm, was selected for the injection. As a rule the vein was exposed and the needle inserted. When a canula was used the vein was dissected from the surrounding tissue, a grooved director inserted beneath it, and the vein ligatured at its distal end. A small longitudinal incision was then made in the vein above the ligature, the canula inserted, and the salt solution allowed to flow. On an average 1,500 c.c. were injected at a time. The pulse and respirations were watched carefully, and at the least untoward symptoms the injection was stopped. It was noted that there was a point up to which the solution could be given and good results obtained; if this was gone beyond, the fluid passed out of the intestines almost as fast as it was injected.

Besides saline injections, hot saline enemata were given every six to eight hours. Hot tannic acid enemata (1 per cent.) were given for diarrhœa and seemed to check the condition better than any other treatment.

The intravenous injection of saline solution was not found to increase the mortality from uræmia and no benefit was noticed from the use of diuretics when uræmia had developed; of all the measures used to induce the kidneys to secrete, large rectal injections of hot saline gave the best results.

In order to prevent the recurrence of diarrhœa, which is said to

follow on intravenous saline injections, Rogers suggests that a hypertonic saline solution should be used. He states that by increasing the strength to double that formerly used (2 drachms of sodium chloride to the pint, or 1·35 per cent., to which 3 grains of calcium chloride may be added) a most gratifying degree of success was obtained. When time does not suffice and the staff of assistants is not sufficiently large for the regular administration of intravenous injections, Rogers recommends the salt solution to be given intraperitoneally.

Gärtner and Beck in 1893, after experiments upon dogs and rabbits, suggested the employment of a hypertonic solution of sodium chloride by intravenous injection in order to prevent exudation from the blood into the intestinal canal. They thought that perhaps a reabsorption of fluid might even take place from the intestine and were able to show in their animal experiments that such a reabsorption took place, Rumpf tried this method of treatment in cholera, but did not obtain any more favourable results with it than with that in which normal salt solution was obtained.

Strong agrees with Rogers that replacement of the lost fluid must be the primary consideration in the treatment of the collapse stage of cholera, but thinks, as shown by the experiments of Gärtner and Beck, it is possible that on injecting hypertonic solutions the toxic products of the cholera spirillum may be more rapidly absorbed, at the same time the reabsorption of any water that may be present takes place.

Correspondence.

MENDELISM AND SEX.

TO THE EDITOR OF THE "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS."

SIR,—Several men have written and asked me if I could make my meaning more clear in regard to this subject, than is apparent to them in my address on "Heredity and Variation," which was published in this Journal last month. It may be of greater general utility if I reply to these correspondents through THE ROYAL ARMY MEDICAL CORPS JOURNAL itself. I will endeavour to do so as briefly as I can.

Experimental evidence indicates that in man, canaries, and fowls, the female is a dominant hybrid or heterozygote, carrying the character of maleness as a recessive, while the male is a recessive homozygote, pure for maleness. From the existence of these two types of sex, we can conceive that the character of femaleness is due to a germ factor which decides the appearance of that sex. We can regard it as a something which is added to maleness, and in its absence maleness is manifested. In this sense, we can conceive and speak of two alternative sex factors, namely, the presence and absence of femaleness. Suppose we represent the presence of femaleness by A, and the absence of femaleness by *a*; then, in man, since the female appears to be a dominant hybrid, we can

represent the female as a heterozygote by the letters A *a*. The male, in man, being pure as to maleness, or, what is the same thing, absence of femaleness, we can represent him as a homozygote by the letters *a a*. In other words, we can say that femaleness is due to the presence of a factor which is absent in the male. Since occasionally masculine secondary characters appear in women, it is not too much to presume that they are carried by the woman, though not usually manifested. The outcome of this view is, we may regard the female as being an extra-developed male, having arisen by the addition of a new factor to maleness; or, it may be that the male has arisen as a defective variation from the female. In any case, we must admit the female to be a more complex organisation than the male, in other words, physiologically, the superior sex.

We know nothing as to what determines sex as the sequel of a fertilisation in the human family, but arguing from the analogy of the study of chromasomes in certain insects, phylloxerans and aphids, it may be that the determination of sex is correlated with the presence of an accessory chromasome in certain of the paternal germ-cells. In man, there may be two kinds of spermatozoa, as in many insects and some animals. May not this absence of a something in the male and its additional presence in the female paternal gamete be hinted at and anticipated by the language used in the second chapter of Genesis, verses 21 and 22?

In conclusion, I would suggest to those interested in this and cognate questions to read an article on this subject, by Mr. C. C. Hurst, in the first number of the *Mendel Journal*, published by Messrs. Taylor, Garnett and Evans, of 54, Fleet Street, E.C.; they will find much to interest them.

I am, etc.,
R. H. Firth,
Brevet-Colonel R.A.M.C.

Aldershot,
December 9th, 1909.

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of the

Royal Army Medical Corps.

Original Communications.

THE DEVELOPMENT OF *TRYPANOSOMA GAMBIENSE* IN *GLOSSINA PALPALIS*.[1]

BY COLONEL SIR DAVID BRUCE, C.B., F.R.S.
CAPTAINS A. E. HAMERTON, D.S.O., AND H. R. BATEMAN.
Royal Army Medical Corps,
AND CAPTAIN F. P. MACKIE.
Indian Medical Service.
Sleeping Sickness Commission of the Royal Society, 1908.

THE following experiment is so complete in itself that no apology is offered for publishing it by itself. In 1903 the Sleeping Sickness Commission of the Royal Society came to the conclusion that the carrying of infection from a sleeping-sickness patient to a healthy person by the *Glossina palpalis* was a mechanical act, and required no previous development of the parasite within the fly. The Commission also held that the power of transferring the disease was lost to the fly forty-eight hours after it had fed on an infected person.

Koch and Stuhlmann, in German East Africa, described developing forms in *Glossina,* but did not succeed in infecting healthy animals by the injection of these forms.

Kleine, in German East Africa, at the end of 1908, succeeded first in showing that *G. palpalis* could convey *Trypanosoma brucei* some fifty days after the fly had fed on an infected animal.

[1] Reprinted from the *Proceedings of the Royal Society*, B, vol. 81.

It seems, at first, strange that this fact should have escaped notice for fifteen years, and can only be accounted for by assuming that it is an event of the rarest for a fly to be found which fulfils the unknown conditions necessary for the development of the trypanosomes in its interior. If we assume that it is only one fly in a hundred or in a thousand in which this development takes place, then the difficulty of observing the phenomenon can be understood.

Take the following experiments, for example :—

TABLE I.—Flies caught in an Infected Area, kept for some days, and then Fed on Healthy Animals.

Trypanosoma brucei—Glossina morsitans.

Experiment	Place	Observer	Number of flies fed	Number of times flies fed	Number of days before infection or under observation	Result
210	Zululand ..	Bruce ..	5	32	64	Negative
242	" ..	" ..	30	11	56	"
232A	" ..	" ..	50	15	34	"

These experiments seemed to show that if flies caught in a highly infected district, into which a horse could not be taken even for a few hours without contracting nagana, are kept without food for a few days—say three to five—they are then incapable of conveying infection. This appeared to be a strong proof that the duration of infectivity in the fly was a short one, since, if this were not the case, one of the 85 flies ought to have been in a condition capable of infecting, having, of course, been infected at some previous date in the "fly country." It may be repeated that these flies were caught in a most highly infected district, so that if *G. morsitans* can remain infective for fifty or sixty days, one at least of the 85 ought to have been in the condition which made it capable of conveying the disease.

This development of the trypanosomes in the fly is strikingly like what occurs in the test tube with Novy's medium. A thousand tubes are inoculated with *T. brucei;* the trypanosomes all appear to die off, but twenty days afterwards a peculiarly resistant individual is found in one tube of the thousand, who has adapted himself to the new environment, and soon multiplies into myriads. What it is which enables this particular individual to adapt itself to such altered conditions is unknown. It is the merest speculation

to call it a sexual act and pick stout forms as females and slender forms as males.

Again, because this late development of the trypanosomes enables a particular fly to remain infective for 100 days, or even possibly for the remainder of its life, it by no means follows that this is the usual method of infection. The mechanical transference of the disease is proved up to the hilt, and for every case which falls a victim to the rare late-infected fly, a thousand must be infected by direct mechanical transference.

Summary of the Experiment which forms the Subject of this Paper.

Before describing at length the experiment which forms the subject of this paper, we may summarise it as follows:—

(1) On March 5th, 1909, sixty *Glossinæ palpalis* caught on the Lake shore were placed in two cages, thirty in each. The flies were fed on two infected monkeys for two days. They were then starved for seventy-two hours to get rid of mechanical transference. The following five days they were placed on a healthy monkey, and every successive period of five days, or thereabouts, on a fresh monkey, up to eighty-six days, when the experiment came to an end. The result was that the first two monkeys remained healthy, but that all the following monkeys up to seventy-five days became infected with *T. gambiense*.

(2) If seven days be deducted for the incubation period, then the flies first become infected eighteen days after their first feed on an infected animal.

(3) There is some evidence that among the sixty flies only one was infective. Fifty-four days after the beginning of the experiment each cage was placed on a separate monkey. Up to that time both the cages of flies had been fed on the same animal. Cage A contained, after fifty-four days, eleven flies. Cage B, four flies. Cage A continued to infect monkeys for twenty-one days more, making a total of seventy-five days. Cage B did not infect. Again, as was natural, the flies gradually died off during the experiment, and as each fly died it was carefully dissected and examined for trypanosomes. Not a single trypanosome of any kind whatever was seen in any dissected fly up to seventy-five days, when a fly died in Cage A which was found to be swarming with trypanosomes similar to *T. gambiense*. After the death of this fly, Cage A ceased to be infective, and when the experiment was stopped the remaining flies were killed off and dissected, but among them not a sign of

a trypanosome could be seen. In the same way the flies remaining in the non-infective Cage B were examined, with a similar negative result.

(4) Here follows an interesting and unique observation. A tiny drop of fluid taken from the gut of the seventy-five-day fly injected under the skin of a monkey gave rise to sleeping sickness after an incubation period of eight days. This, so far as we are aware, is the first time this has been recorded.

(5) It will be seen from the detailed experiment that the flies were starved for three days between several of the experiments. This, of course, was to get rid of the fallacy of mechanical transference.

(6) It may be said that perhaps these monkeys became infected by some other means than the flies in the cage—for example, by other biting flies, or by contact. To this it may be answered that there are more than 200 monkeys under observation here, sick and healthy. They are all examined twice a week, but during the last eight months not a single case of accidental infection has taken place.

Details of the Experiment.

Experiment 663.

To ascertain if development of *T. gambiense* takes place in the interior of *G. palpalis*, and, if so, how long does the fly remain infective.

March 5th, 1909.—Two batches of *G. palpalis* caught on the Lake shore, consisting of thirty flies in each batch, were fed on monkeys, Experiments 568 and 214, whose blood contained numbers of *T. gambiense.*

March 6th.—The flies again fed as on the 5th, to ensure that as many as possible should get a feed of the infected blood. Nearly all the flies fed on one or other occasion. The flies are kept in a moist atmosphere at 22° C.

The following table gives the principal details of the experiment:—

TABLE II.

Date	Day of Experi-ment	Procedure	Result		Remarks
			Positive	Negative	
1909					
Mar. 5	—	Flies fed on infected monkey	..	..	..
,, 6	1	,, ,, ,, ,,	..	..	..
,, 7	2	Flies starved 72 hours ..	..	..	..
,, 8	3	,, ,, ,, ..	..	..	..

TABLE II.—*continued.*

Date	Day of Experiment	Procedure	Result: Positive	Result: Negative	Remarks
1909					
Mar. 9	4				
,, 10	5				
,, 11	6	Fed on monkey 579	..	–	..
,, 12	7				
,, 13	8				
,, 14	9				
,, 15	10				
,, 16	11	,, ,, 651	..	–	..
,, 17	12				
,, 18	13				
,, 19	14				
,, 20	15				
,, 21	16	,, ,, 652	+	..	..
,, 22	17				
,, 23	18				
,, 24	19				
,, 25	20				
,, 26	21	,, ,, 653	+	..	..
,, 27	22				
,, 28	23				
,, 29	24				
,, 30	25				
,, 31	26	,, ,, 654	+	..	..
Apr. 1	27				
,, 2	28				
,, 3	29				
,, 4	30				
,, 5	31	,, ,, 655	+	..	..
,, 6	32				
,, 7	33				
,, 8	34				
,, 9	35				
,, 10	36	,, ,, 672	+	..	..
,, 11	37				
,, 12	38				
,, 13	39				
,, 14	40	,, ,, 722	+	..	..
,, 15	41				
,, 16	42	Starved for 72 hours	..	..	..
,, 17	43				
,, 18	44				
,, 19	45				
,, 20	46				
,, 21	47	Fed on monkey 727	+	..	
,, 22	48				
,, 23	49				
,, 24	50				
,, 25	51				
,, 26	52	Starved for 76 hours	..	..	..
,, 27	53				
,, 28	54	Cage A fed on Monkey 735 ..	+	..	..
,, 29	55				
,, 30	56				
May 1	57				
,, 2	58	,, B ,, ,, 736 ..	..	–	..

TABLE II.—*continued.*

Date	Day of Experiment	Procedure	Result: Positive	Result: Negative	Remarks
1909					
May 3	59	Starved for 74 hours	..	..	..
,, 4	60				
,, 5	61	Cage A fed on Monkey 749 ..	+	..	..
,, 6	62				
,, 7	63				
,, 8	64				
,, 9	65	,, B ,, ,, 748 ..	..	–	..
,, 10	66	Starved for 72 hours	..	..	..
,, 11	67				
,, 12	68	Cage A fed on Monkey 765 ..	+	..	..
,, 13	69				May 13.—Flies remaining in Cage B killed and dissected
,, 14	70				
,, 15	71				
,, 16	72	,, B ,, ,, 764 ..	..	–	
,, 17	73	Starved for 72 hours	..	..	..
,, 18	74				
,, 19	75				May 19.—Fly 866 found dead in Cage A and dissected. Did not feed on Monkey 848.
,, 20	76				
,, 21	77	Cage A fed on Monkey 848 ..	..	–	
,, 22	78				
,, 23	79				
,, 24	80	Starved for 72 hours			
,, 25	81				
,, 26	82				
,, 27	83				
,, 28	84	Cage A fed on Monkey 911 ..	..	–	Expts. 848 and 911 healthy on June 7, 1909.
,, 29	85				
,, 30	86				
,, 31	87	Experiment stopped	..	..	Remaining flies killed and dissected.

Remarks on the Experiment.

Everyone will agree that this is a most interesting experiment. It is evident that a single infected fly did all the mischief, and by good luck this fly was detected. Captain A. E. Hamerton, D.S.O., had charge of the experiment at first, and on his leaving Mpumu about the beginning of May, it fell to Serjeant A. Gibbons, Royal Army Medical Corps. Both are to be congratulated on the results, which are the outcome of care and thoroughness. Captain F. P. Mackie had the good fortune to dissect the fly which did the injury, and which will be fully described later.

Incubation Period.

From the experiment may be drawn the incubation period in monkeys bitten by a late-infected fly.

It is remarkable how regular this is in those monkeys which gave a positive result. This shows how very infective fly 866 was. Apparently each time it bit it infected.

The following table gives the period of incubation in each case:—

TABLE III.

Date	Experiment	Flies first fed	Trypanosomes appeared in blood	Number of days before trypanosomes appeared in blood
1909		1909	1909	
March 19	652	March 19	March 30	11
,, 24	653	,, 24	April 2	9
,, 29	654	,, 29	,, 6	8
April 3	655	April 3	,, 13	10
,, 8	672	,, 8	,, 15	7
,, 13	722	,, 13	,, 20	7
,, 18	727	,, 18	,, 24	6
,, 28	735	,, 28	May 5	7
May 5	749	May 5	,, 11	6
,, 12	765	,, 12	,, 17	5

Leaving out the first experiment, 652, as it is doubtful as to the exact day fly 866 became infective, this gives an average incubation period of seven days. It would therefore appear that fly 866 probably infected each animal on the first day it bit it, showing how dangerous such an infected fly is.

DESCRIPTION OF THE *Glossina palpalis*, FLY 866, WHICH WAS DISSECTED SEVENTY-FIVE DAYS AFTER HAVING FED ON A MONKEY WHOSE BLOOD CONTAINED *Trypanosoma gambiense*.

Experiment 866.

May 19, 1909.—Dissected a *G. palpalis*, which was found dead to-day in Cage A of Experiment 663. On removing the viscera by the usual method, the mid-gut was seen to be of a pale salmon-pink. A small quantity of its contents, examined in the fresh condition, was found to contain enormous numbers of trypanosomes. The tube of this part of the intestine was absolutely crammed with active, seething masses of these flagellates. In regard to the other parts of the fly, nothing was seen in the proboscis. In the proventriculus one trypanosome only was found. The salivary glands contained large numbers of altered-looking trypanosomes, the fore-gut many large stout forms, with bright granules. The crop was empty and showed nothing. The Malpighian tubules, hind-gut, and proctodæum also were drawn blank.

In addition to examining these organs in the fresh condition, smears were made and stained. The examination of these stained specimens gave the following results:—

The Salivary Glands.—These had been carefully removed before

the intestine was opened, and therefore had no chance of being fouled. As will be seen from the coloured drawing (fig. 1), the trypanosomes found in these glands differed from those seen in the intestine. The bodies are very irregular in shape, and contain, besides a reddish-stained nucleus, dark deeply-stained coarse chromatin granules. The other cell contents remain unstained. Free chromatin granules and flagella are to be seen scattered over the field. Sometimes the bodies are definitely pear-shaped, with a flagellum coming from the narrow end, and rarely a more definite trypanosome shape can be seen; but never a true trypanosome.

[It is a matter of deep regret that an inoculation experiment was not made with an emulsion of part of the salivary glands.]

The Fore-gut.—The fore-gut contained many trypanosomes. The cytoplasm stains a pale blue, and the nucleus a reddish purple. The micronucleus is not distinctly seen in some of the trypanosomes, but when it is, it is always distinctly posterior to the nucleus. The protoplasm contains many coarse darkly-stained chromatin granules. The undulating membrane is less marked than in the normal blood trypanosome, and the flagellum, which usually springs from a micronucleus-like body, is less deeply stained.

The Mid-gut.—The mid-gut contained innumerable trypanosomes of the *gambiense* type. Some are dividing, and all have a well-marked nucleus and micronucleus, the latter at or near the posterior extremity. The protoplasm contains many chromatin granules, and an undulating membrane and flagellum are present (figs. 6 to 16). Many groups, or rosettes, composed of fifteen to twenty individuals, occur, the flagella pointing outwards.

The *proboscis, proventriculus, thoracic gut, crop, hind-gut,* and *Malpighian tubes* contained no trypanosomes.

The most interesting thing in this description of the examination of fly 866 is the condition of the salivary glands. How these trypanosome-like bodies, or derivatives of trypanosomes, got into them is a mystery, and we will content ourselves at present with merely placing the bare fact on record until the salivary glands of similarly infected flies are examined.

There is one fallacy which might be pointed out. It is assumed that fly 866 became infected on the first or second day of the experiment. It is possible it became infected when feeding on the fifth day on an animal which showed trypanosomes in its blood a day or two later. This however, is unlikely, as no other fly showed trypanosomes on dissection.

In order to make the story more complete, figs. 2 to 5 represent

the *T. gambiense* from the blood of one of the monkeys on which the flies were fed at the beginning of the experiment.

Proportion of Infected Flies to Non-Infected in Nature.

In the experiment under consideration it is seen that, in artificially infected flies, only one in sixty showed the phenomenon of late infectivity. In nature the proportion must be less, as many of the flies, in many places at least, can never have fed on an animal whose blood contained *T. gambiense*.

TABLE IV.—Table to show probable Number of naturally infected Flies per thousand.

Experiment	Place	Observer	Number of flies fed before infection took place	Result: Positive	Result: Negative	Probable number of naturally infected flies per thousand
		Trypanosoma brucei—Glossina morsitans.				
225	Zululand ..	Bruce	104	+	..	9·6
236	,, ..	,, ...	108	+	..	9·2
		Trypanosoma gambiense—Glossina palpalis.				
94	Uganda ..	Bruce and Nabarro	89	+	..	11·2
130	,, ..	Bruce, Nabarro, and Greig	850	+	..	1·2
131	,, ..	,, ,,	506	+	..	1·9
136	,, ..	Nabarro and Greig	723	..	–	..
228	,, ..	Greig and Gray ..	866	+	..	1·2
301	,, ..	,, ,,	2,299	..	–	..
45	Leopoldville..	Dutton, Todd, and Hannington	457	..	–	..
46	,, ..	,, ,,	552	..	–	..
128A	River ..	,, ,,	25	..	–	..
139	,, ..	,, ,,	262	..	–	..
141	,, ..	,, ,,	52	..	–	..
182	Kasongo ..	,, ,,	211	..	–	..
198	,, ..	,, ,,	2,659	+	..	0·4
203	,, ..	,, ,,	1,789	..	–	..
213	,, ..	,, ,,	717	..	–	..
52	Uganda ..	Bruce, Hamerton, Bateman, and Mackie	41	..	–	..
214	,, ..	,, ,,	3,284	+	..	0·3
568	,, ..	,, ,,	178	+	..	5·6
571	,, ..	,, ,,	850	+	..	1·2
53*	,, ..	,, ,,	21	..	–	..
612	,, ..	,, ,,	615	+	..	1·6
674	,, ..	,, ,,	2,315	+	..	0·4

* Animal died.

That there can be but few under natural conditions Table IV. shows. The table is made by subtracting the flies fed on the

animal during the last seven days, before trypanosomes were found in the blood, this being the incubation period, from the total number. The experiments consist in catching tsetse flies in the infected area, bringing them to the laboratory and placing them straightway on healthy animals.

The first two experiments were made with *T. brucei* and *G. morsitans*, and it would appear from them that 104 and 108 flies were used respectively before an infective one was found. This perhaps explains why Bruce's eighty-five flies failed to infect.

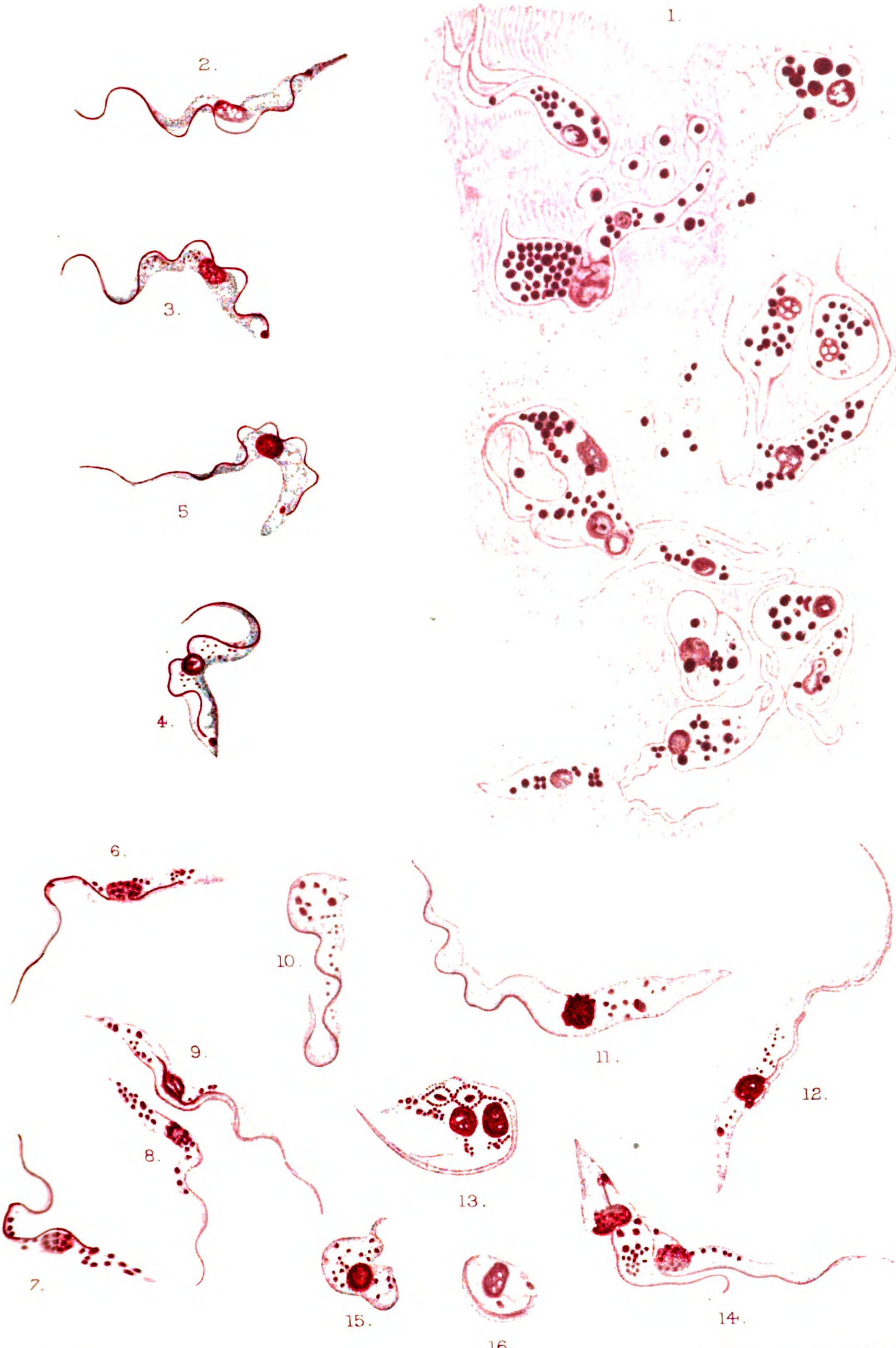
In the experiments with *T. gambiense* and *G. palpalis* the average is 2·5 per thousand. It is, of course, impossible to tell how many of these positive experiments were infected by mechanical transference or by a late-infective fly; but, in any case, the proportion is small. If this were not so, all the native population of the Lake shore, and most of the Europeans in Uganda, would long ago have been blotted out.

DESCRIPTION OF PLATE.

Smear preparation of salivary glands of *Glossina palpalis*, Experiment 866, stained Giemsa, showing irregularly shaped trypanosomes, with unstained protoplasm, reddish-coloured nuclei, and deeply stained chromatin granules. Note the chromatin granules scattered singly about the field, each surrounded by a pale area, fig. 1. x 2,000.

Normal *Trypanosoma gambiense* from monkey, Experiment 568, on which the flies were fed at the beginning of the experiment, figs. 2, 3, 4, and 5. x 2,000.

Trypanosomes from the mid-gut of infected fly, Experiment 866, figs. 6 to 16. x 2,000.



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MEDICAL HISTORY OF THE SOUTH AFRICAN WAR.

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THE PREVALENCE OF EPIDEMIC DISEASE IN THE FIELD.

I.

In Previous Campaigns.

As has been already pointed out, by far the most important feature of the disease history of the South African war was the development of epidemic disease: 30 per cent. of the admissions and 45 per cent. of the deaths from all causes (including killed in action), or 86 per cent. of the deaths from disease, were due to *continued fevers* and *dysentery*.

This predominance is, of course, common to all campaigns in tropical or sub-tropical regions, as may be seen in Tables A and B. Possibly the best way to obtain an idea of the importance of these diseases is to consider them in relation to the admissions and deaths from all diseases. The results (shown below) give their incidence and mortality as percentages of the *total disease* incidence and mortality :—

Campaign	Admissions, Per cent.	Deaths, Per cent.
Nile F.F., 1889	42*	100*
Soudan, 1885-86	39	87*
Egypt, 1882	24	66*
Chitral R.F., 1895	26	90
Mashonaland, 1896-97	38*	—*
Dongola E.F., 1896	34	49*
Matabeleland, 1896	38*	100*
Nile E.F., 1898	48	89
China F.F., 1900-01	9	71*
Nile E.F., 1884-85	40	88
S. African War, 1899-1902	34	86

Certain of these percentages are drawn from too few figures to be trustworthy; these are marked with a star. If the percentages be arranged in order of magnitude, it will be found that as regards the admissions the value for the South African war heads the lower group, and there is a significant difference between this and the lowest value of the upper group, that is, the percentage of the total disease admissions due to epidemic diseases was in South Africa low as compared with previous experience. As regards the deaths, the only significant values lie between 86 per cent. (South African war) and 90 per cent. These may be taken to be identical; the figures

for the South African war have, however, the greatest value from their very great number in proportion to the others. The normal percentage of disease deaths due to epidemic disease in our past experience may then be taken as 86 per cent. of the total.

There is, then, every reason for a detailed examination of the conditions under which these diseases appear, in the hope that this may assist preventive measures in future campaigns.

The circumstances of the South African war were in some ways favourable to such an examination, as will be seen later; in other ways they were unfavourable, in that detailed histories of individual outbreaks are only rarely available. This, however, is the less important, in that every one now accepts as effective in particular times and places the various modes of propagation which have been shown to be actually or probably effective: water, foodstuffs (especially milk), dust, flies, personal contact. Further, the conditions were such that probably each of these possible modes of propagation played its part in most, if not in all, of the outbreaks, or it might be more accurately said, in the steady prevalence of disease throughout the war. But though this was the case, the examination seems to show that the one predominant factor was all that may be included under the term "personal infection."

This predominance of epidemic disease is not, of course, peculiar to the British Army, as some of our critics appear to believe. One has only to turn to such a book as Dr. Otto Niedner's "Kriegs-epidemieen des 19 Jahrhunderts" to see that this predominance affects every army in every clime. The latest comparison is with the Japanese army in the Manchurian war. Their *recorded* admission-rate for these epidemic diseases was certainly considerably smaller than ours in South Africa; their mortality was a little smaller, but the case mortality for these epidemic diseases in the Japanese army was 33·4 per cent. of the admissions, in South Africa it was 9·8 per cent. of the admissions for enteric fever and dysentery only, 7·28 if the other continued fevers are included. The two sets of ratios are then really not comparable; the standard of diagnosis in the two cases has been absolutely different.

II.

(1) The history of the Army in South Africa, in relation to the two epidemic diseases, enteric fever and dysentery, may be divided into two phases: the first that of the invasion, development, and dissemination of these two diseases; the second, that during which both diseases were more or less generally prevalent, varying in the

degree of incidence according to seasonal changes and to local conditions. The first period was characterized by certain severe epidemics, of which the more important were those in Ladysmith, Bloemfontein and Kroonstadt.

(2) *The Period of Invasion and Development.*—Here one has to distinguish between two bodies of troops, which differed essentially in environment, those shut up in beleaguered towns, Ladysmith, Kimberley, and Mafeking, and those with a greater degree of freedom, in the field or on the lines of communication.

Experience would also lead one to expect, from differences in the geographical position and the relationship to the rainy season, a somewhat earlier outbreak in Natal than on the western side. Further, there was this difference between these two areas, that enteric fever had been prevalent in the garrison of Natal to a considerable degree in the seasons 1896-97, 1897-98, and 1898-99; while in the West, little or no enteric fever had occurred among the troops,[1] who, however, were not stationed in the towns afterwards invested by the enemy. So that, on the one hand, some of the troops and all the localities were infected; on the other, though the towns were infected, the troops were relatively free from infection.

It appears necessary, then, to outline the development of enteric fever :—

(*a*) In Natal (i.) in the garrison of Ladysmith ; (ii.) in the Natal Field Army.

(*b*) On the Western line, and specially (i.) Lord Methuen's force, (ii.) the force under Lord Roberts.

(3) As a preliminary, it is essential to the proper understanding of the position, to consider the relation of the so-called simple continued fever to enteric fever. It appears to be possible to come to some definite conclusion as regards the particular case of South Africa, a conclusion which may be stated as follows :—

(*a*) There is no lower limit to the reaction following specific enteric infection—that is, there is no febrile attack, however slight or evanescent, which may not in fact be due to specific enteric infection.

(*b*) A comparison of our records in various parts of the globe over a series of years shows that where other specific fevers (malarial and Mediterranean fevers) are absent, variations in the prevalence of the indefinite class (the so-called simple continued

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[1] See table of cases for these years, vol. xiii., p. 378.

fever) follow very closely variations in the recorded prevalence of enteric fever—strong evidence of their common origin, although the relative proportions of the two are not always constant.

(*c*) Malarial and Mediterranean fevers being practically absent from South Africa, one can only conclude that the great majority of cases of continued fever occurring there are closely related to and probably are, in fact, enteric fever.

It is, however, hardly justifiable, even in South Africa, to take the whole class simple continued fever as being in fact enteric fever. If one looks at it simply from the preventive side, and circumstances permit of effective isolation, segregation and disinfection being carried out in every case of continued fever, it is certainly safer to exceed the actual numbers requiring these special measures than to omit any. But this does not give the true incidence of the epidemic disease. There appears to be certainly one form of ephemeral fever which is not due to any specific typhoid infection, but to fatigue, especially in connection with exposure to the sun,[1] or to a high temperature. A large number of cases of this nature occurred during the operations in the Orange Free State, in the relief of Kimberley and rush to Paardeberg. There is apparently one form associated with congestion of the liver, most common at times and in those places where great daily variations of the external temperature take place, and another, associated with constipation and general gastric derangement, correlated with an excessive nitrogenous diet, and, like the last, often associated with too much alcohol. It is possible that the last two may be due to an abnormal growth of the intestinal flora, but they appear to be distinct from a true typhoid infection.[2] The class simple continued fever as it stands also includes a certain proportion of cases which should have been returned under some other specific disease. One must not overlook the possibility that some of the indefinite fevers may have been the "phlebotomus" fever first described by Doerr.

It is difficult at the present moment to deal with the question of what proportion of these simple continued fevers are actually enteric fever. We have behind us many series of statistics in which the diagnosis was based solely on clinical features, &c. (which are untrustworthy) and the probabilities. We have series

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[1] See the results of observations by Dr. Haldane, Dr. Sutton, and others.

[2] See Ficker, *Arch. für Hygiene*, lvii., p. 56, on the influence of overwork on the permeability of the intestine to germs.

of cases in which laboratory methods showed larval, abortive and extremely irregular forms to be actually typhoid infections. But we have not as yet any general series giving the results of the bacteriological examination of a large number of consecutive febrile cases, and until we get that, we cannot say accurately what proportion these irregular forms bear to the well-marked cases, nor what proportion are free from typhoid infection. In Maritzburg between 1891 and 1897 (where the diagnosis practically rested on clinical evidence) of 977 consecutive cases of continued fever, 30·6 per cent. were returned as enteric fever, the remainder—69·4—as simple continued fever. These last fell into two distinct classes according to severity and duration: 29·7 per cent. were relatively severe, and were probably actually enteric fever; 39·8 per cent. were mild, and a proportion were possibly enteric fever. That is to say, during that period the recorded enteric fever did not represent quite half the probable actual incidence. Again, during the whole twenty weeks of the epidemic at Bloemfontein in 1900, the cases returned as enteric fever represented 57 per cent. of the total cases of fever, but during the first eight weeks they represented only 39 per cent., while during the last twelve weeks they rose to 73 per cent. of the total febrile cases. There was certainly a change in the standard of diagnosis after the first eight weeks had elapsed, though there was no difference in the type of disease. There appears to be no question that the cases of enteric fever were not fully diagnosed during the first period, and we certainly had the impression during the later period that any possible errors were in excess. Probably we should be nearly correct in saying that about two-thirds of the total febrile cases were in fact enteric fever;[1] further, in considering possible foci of infection and channels of dissemination, we must take every recorded case of simple continued fever as possibly enteric fever.

As regards the differentiation of paratyphoid from enteric fever, it does not appear at the present stage to be a matter of practical importance.[2] If it is as infective as true enteric fever, if it causes as much inefficiency, either by the number of individuals affected or the prolonged duration of individual attacks, it is not important

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[1] Of the recorded cases of continued fever in South Africa, 63·6 per cent. were returned as enteric fever, the remainder as simple continued fever, which agrees with the hypothesis stated above.

[2] *See* Birt, Journal of the Royal Army Medical Corps, vol. ix., p. 145; and Statham, p. 226 *et seq.*

from the point of view of prevention to differentiate between the two diseases; measures which hinder or prevent the development of the more fatal disease will also inhibit the milder form. Further, there was during the war no attempt to make this distinction, then barely recognised.

(4) The materials available for the discussion of the mode of development of these epidemic diseases are derived from the fugitive weekly returns, rendered of necessity somewhat hurriedly, and in which the diagnosis of the included diseases is therefore sometimes doubtful. But if we deal in large groups, associating the diseases most likely to be confused, we shall have materials which are probably not vitiated by any material error, and we can later dissect these groups into their components, which, however, will probably be less accurate.

With regard to the general question, the diagnosis of disease on service, it must be remembered that where the staff is overworked, where there is pressure on the hospitals and difficulties in carrying out the primary duty of the hospital, the actual succour of the sick and wounded, all clerical work tends to be neglected, or at least minimised as far as possible. When sick returns had to be made up weekly, two courses were open in the obscurer cases: either to diagnose provisionally with a view to changing the diagnosis later if further observation showed the necessity, or to leave the diagnosis open for the moment, returning the case as "not yet diagnosed." Now either of these courses, when carried to its conclusion, involves additional clerical labour, a thing that is of little moment in times of peace, but one which is to be considered with the reduced staff available during times of pressure, when every trained man is needed for ward work. Hence, under this system of weekly returns the *record* of diagnosis often failed in accuracy; this, however, did not involve any failure in the actual diagnosis and treatment. The difference between the two is vital. Under the present arrangements, with the diminution of the actual clerical work in the hospitals, the same difficulty should not arise to any great extent. But it must be remembered that if scientific accuracy in every detail, especially in the records, is expected on service (as indeed it should be), then a sufficiently large staff must be available. Accurate record is of the highest importance, but the time and energies of officers and men must first be directed to the care of the sick and wounded, and if the trained staff suffices for this alone, then the accuracy of the records must and will suffer. Such was the case during a great part of the South African War, where the trained staff became relatively smaller as the war went on.

(5) The two disease groups of importance here are, first, the continued fevers—practically consisting of enteric and S. C. fevers, with possibly (chiefly in the Ladysmith garrison) a few relapse cases of malarial fever. On the other hand, a few cases of continued fever may have been included in the malarial group. There is no reason to believe, however, that this source of error attained any magnitude; there was in all probability no fresh malarial infection in Natal. The second group—of all bowel complaints—includes dysentery, diarrhœa, and inflammation of the intestines. It is obvious that these two main groups are not mutually exclusive in such circumstances as obtained during the war. Apart from the probability that some proportion of the cases of diarrhœa were in fact manifestations of enteric infection, one knows as a matter of experience that the differential diagnosis of enteric fever from dysentery, or from inflammation of the intestines, is not always a simple matter when clinical methods are alone available and the time under observation is limited. But while we cannot claim absolute accuracy for these figures, it probably may be assumed without any serious error that these two groups of figures broadly represent the actual conditions as to prevalence in time and place, and if we bear the probable sources of error in mind their consideration may prove instructive.

(6) Diagrams have then been prepared from the weekly returns from the hospitals dealing with the two main groups of diseases referred to above, which relate to the two large bodies of men in Natal—the Garrison of Ladysmith and the Natal Field Army—for the Western line (De Aar, Orange River, Modder River), and lastly for the force advancing to Kimberley and Bloemfontein, and in Bloemfontein itself.

The two Natal groups will be considered first in some detail, and in relation to one another. Their consideration also gives an opportunity for the discussion of some general features which affect all the examples in some, usually an important, degree. Finally, the various outbreaks will be compared with one another.

(7) *Development in Natal.*—In these two bodies of men in Natal we find the greatest differences in environment. We have on the one hand the beleaguered and starved garrison of Ladysmith, on the other the well-fed and mobile field army; the one confined to a limited and infected area, the other unhampered and on normal soil; one composed almost exclusively of seasoned troops, the other containing a much larger proportion of young soldiers. Yet, with these differences, there is a great similarity in the disease relations of the two groups.

A.—In the Garrison of Ladysmith.

(i.) *Composition of the Garrison.*—The garrison of Ladysmith was almost entirely composed of what we would term "seasoned" men. That is, excepting two battalions of infantry from the Mediterranean, and one from Egypt, which arrived after August, 1899, the whole of the troops had served either in India (from which they were sent to Natal), or had been in South Africa, and (with one exception, the 1st Battalion Liverpool Regiment) indeed in Natal during at least one hot season. That is, of course, setting aside drafts which may have joined them (the regiments in South Africa) direct from England, but which in no case formed more than a small proportion of any unit. Of the 12,700 of all ranks in the garrison, some 1,700 had been inoculated against enteric fever, at periods varying from two to eleven months before their arrival. The Liverpool Regiment indeed were inoculated in Ladysmith. Apart from the question of the effect of inoculation on the small proportion who were so protected, one finds that in spite of the (acquired) partial immunity which our experience would lead us to believe that these "seasoned" troops would have shown under ordinary peace conditions, the circumstances were such that the actual incidence of enteric fever on the whole garrison was very heavy.

From the beginning of November, Ladysmith was an isolated area; no cases were brought into it from outside.

(ii.) *General Sanitary Conditions.*—In order to understand the position we must consider the previous history of Ladysmith. After having been unoccupied as a military station for many years, this small town was re-occupied in May, 1897. No barracks existed; those prepared for the troops were of a temporary nature, and the arrangements (especially the drainage system) were based on a probable short occupation, and were therefore somewhat inadequate. The water supply in particular was bad. As shown in the table,[1] the garrison of Ladysmith suffered severely from enteric fever during the hot seasons 1897-98 and 1898-99 (as did the civil population) and, as a consequence, both the military camp and the town were infected areas. As a result of the epidemic in 1898-99, the sanitary conditions of the camp were considerably improved, including the provision of a new intake for the water supply, which however was still drawn from the Klip River.

The circumstances attending the earlier operations in Northern Natal prior to the siege were not such as to admit of any special

[1] Vol. xiii., p. 373.

attention being paid to the development of sanitary improvements, and as a consequence the commencement of the siege found a thickly populated area (about 21,000 souls, civil and military) devoid of any special provision for the sudden increase of its population.

A pail system is used for the removal of excreta almost universally throughout South Africa. This system, always undesirable, and requiring careful supervision, is not suited to the subtropical climate of Natal, where, amongst other objections, labour difficulties result in the system being very carelessly carried out. The conditions in Ladysmith in this respect were probably no worse than elsewhere, but they contributed to the fouling of the soil and water supplies, and so to the spread of infectious diseases. We had therefore at Ladysmith three factors provocative of an epidemic, a bad water supply, a bad removal system, and a polluted soil.

(iii.) *Water Supply.*—The water supply merits some special consideration. The source was the Klip River, a tributary of the Tugela. This, like other South African streams, varies greatly in volume according to the season; much and rapidly affected by heavy rain, at such times it carries down a large quantity of mineral matter, and even in the dry season the water contains a large quantity of finely divided inorganic matter, which clogs sterilising filters. In addition to these materials, analyses showed that it was highly contaminated by organic matter, probably from drainage from the town. Efforts were made to eliminate this last factor by the provision of a new intake higher up the river, but the supply so provided was insufficient for the garrison during the siege, and was in fact, cut off by the enemy at the beginning of the investment. An installation of Berkefeld and Pasteur-Chamberland filters with the necessary tanks and pumps had been ordered for the use of the permanent garrison, and was despatched to South Africa, but did not arrive in Ladysmith before the siege.

During the occupation of Ladysmith (before the war), various methods of purification had been adopted. The water was clarified by the addition of alum, or by a rough filtration, and was afterwards boiled. Sterilising filters had been used privately, but were found, as in Maritzburg, to require constant attention and cleaning to maintain the output. During the siege, the water was perforce taken from the old intake, within the drainage area of the town, the surrounding lines and portions of the Boer positions. Hence, the pollution of the water during the siege must have been worse than during the period before the war, if that indeed were possible. Some small, indeed almost negligible, supplies of better quality

were available, "the tanks of aerated water factories," and "rain water from various tanks throughout the town."

To remedy these defects several measures were taken. The engineers of the "Powerful" in conjunction with the railway authorities erected a condensing plant, using locomotive boilers; this allowed of a supply of condensed water for a portion of the garrison, at first about half a gallon per head per day, later on when fuel became more scarce, about one quarter gallon. The water was also cleared by alum and sedimentation, or by rough filtration through square or pyramidal "jelly-bag" filters of linen, stretched on wooden frames, and filled with wood ashes, a system originating in the field hospitals, and afterwards extended to all units. The cleared water was then boiled when fuel was available.

It is impossible to ascertain how far these methods of purification were applied to the water actually drunk by the troops. In the circumstances of the siege, the wide area covered (with a perimeter on the inner line alone of 14 miles), the incessant coming and going of larger or smaller bodies of men, the probabilities are that even though means of purification were available, yet most of the water actually consumed was in an unpurified condition. More than one officer who served in Ladysmith during the siege has mentioned an apparent improvement in the health of the troops under his immediate observation, following on the adoption of one or other of these forms of purification. But it is probable that under the conditions of the siege every unit in the garrison was exposed during some part of each day to the average conditions of the *garrison* as distinct from the *regimental* conditions, and the consolidated statistics of the whole garrison during the whole period of the siege do not show any improvement which can be attributed to these measures. There certainly was a temporary decline in the admissions for all continued fevers during the latter half of December, which may equally well be attributed to other causes, and there was a decline which was permanent in the recorded cases of enteric fever from the same date. But this would appear to be the result of a change of nomenclature, and not a real diminution of the disease.

The actual connection between these probable causes and the epidemic may be deferred until the features of the development in the field army of Natal have been outlined.

(iv.) *The General Incidence of Disease.*—The strength in Ladysmith on November 2nd, 1899, was as follows [1]:—

[1] Ward, Appendix 37, Royal War Commission.

Officers, other ranks and white employees	12,700
Cape boys and Kaffirs	1,400
Indian natives	1,500
Horses	5,800
Mules	4,342

The statistics of sickness refer only to the Europeans, 12,700, but the other details have been added to give an idea of the additional difficulties in sanitation in a closed area. The civil population brought the total numbers up to 21,000. The garrison was, as has been pointed out, almost entirely composed of seasoned units.

Between November 2nd, 1899,[1] and March 2nd, 1900—121 days—the cases of epidemic disease admitted to the hospitals were as follows :—

Enteric fever cases	1,280	.. Deaths 360	Total cases	2,250
Simple continued fever cases	970	.. —	,, deaths	360
Dysentery cases	1,841	.. Deaths 105	Total cases	2,374
Diarrhœa ,, ...	491	.. —	,, deaths	105
Inflammation of intestines ..	42	.. —		

giving incidence rates per 1,000 per annum of 533 for the continued fevers, for dysentery alone 438, and 563 for bowel complaints, and a case mortality for enteric fever alone of 28 per cent., for all continued fevers of 16 per cent., for dysentery 5·70 per cent., or all bowel complaints 4·42 per cent.

These incidence rates are, of course, only approximate; no allowance has been made for wastage, so that the actual rates were even higher than these enormous rates. The type of disease may also be estimated from the case mortality,[2] which is unusually high, and probably determined largely by the conditions of the siege.

Incidence rates per annum are, of course, hardly applicable here, but it is only by using them that any comparison with other outbreaks can be made.

The weekly variations in the number of admissions for the groups (continued fevers and bowel complaints), are shown in fig. 2. The first fourteen weeks—to January 19th—are comparable with the same period in the field army. The characteristics of the epidemic will be summarised later. In fig. 3, the fevers are

[1] The beginning of the siege. The incidence before this was extremely small; it is shown in the figure.

[2] The mean case mortality over the whole war was 13·9 for the continued fevers, and 8·53 for bowel complaints.

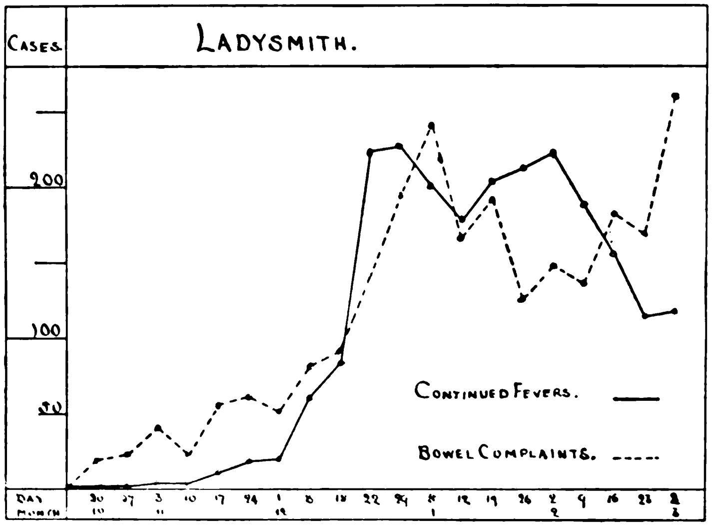
Cases.
Ladysmith.
200
100
50
Continued Fevers.
Bowel Complaints.
Day
Month

Fig. 2.

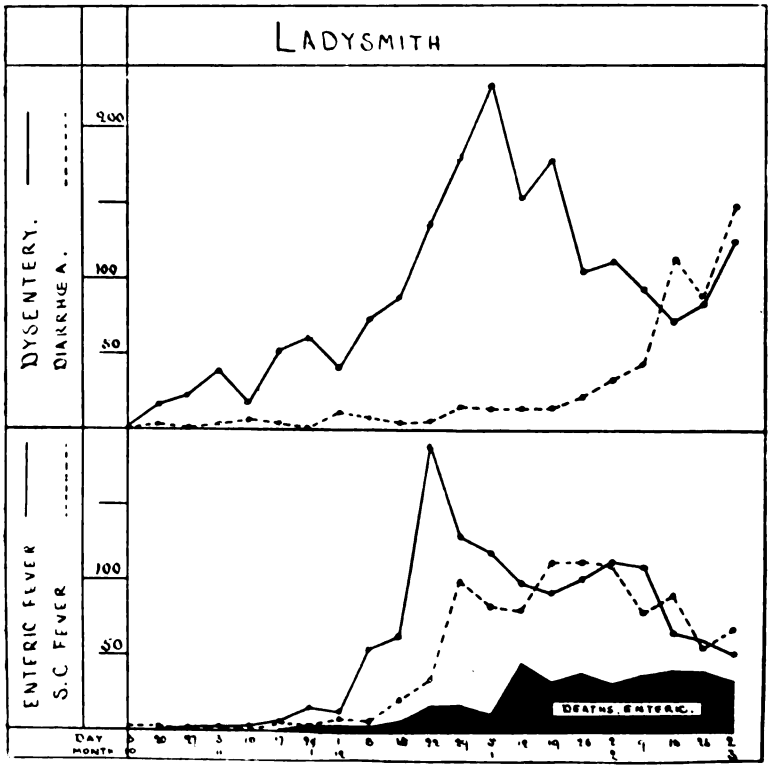
Ladysmith
200
100
50
Dysentery.
Diarrhœa.
Enteric Fever
S.C Fever
100
50
Deaths. Enteric.
Day
Month

Fig. 3.

differentiated into enteric and simple continued fever, and it will be observed that the proportion is not constant throughout, but that simple continued fever, while low in the early period, actually predominates from January, 1900. The deaths from enteric fever are also shown; they attained a high level about four weeks after the maximum incidence of enteric, and that high level was maintained to the date of the relief. No deaths occurred from simple continued fever during the period under review. It is hardly possible to come to any conclusion but that the difference in the periods before and after the beginning of the year was diagnostic, not essential, and that there was no material change in the type of disease.

The early predominance of dysentery is also shown in the upper part of the same figure.

B.—The Natal Field Army.

(i.) *Composition.*—The troops in Southern Natal consisted almost entirely of the force for the relief of Ladysmith, there was but a relatively insignificant number of troops on the line of communication and elsewhere. The relief force began to concentrate at Estcourt and Frere in the end of November; the concentration was completed early in December, and on the 9th of that month the strength of the relief force at Frere was approximately 706 officers and 18,762 of other ranks.[1] Troops landed in Natal during the remainder of December and the first few days of January, 1900, bringing the total in Southern Natal to about 902 officers and 26,067 other ranks on February 11.[2] All the troops landed in Natal at this time were from England, and the embarkation returns[3] show that of 20,679 infantry embarked, 10,404, or rather more than half, were reservists, so that the proportion of young soldiers in the ranks must have been low. Besides these immigrant troops, there were, both in the field and on the line of communication, Colonial Corps, composed at this time almost entirely of residents in the country. Hence the army in Southern Natal was comparatively well seasoned. It may, however, be noted that the *recent* exposure to enteric infection had been much less in this group. From the beginning of January, the composition of the force did not vary materially.

[1] "Official History of the War," vol. i., p. 333.

[2] These strengths are taken from the Appendices to vol. i. of the "Official History of the War."

[3] Appendix 8, "Royal War Commission."

(ii.) *General Hygienic Conditions.*—One may summarise the main elements in the hygienic relations of the field army as follows: the water supply was from various sources at different times, usually—indeed, almost always—river water; it was almost entirely unfiltered. The food—the war ration—was good and sufficient. The disposal of excreta and of refuse was on the usual lines under war conditions—that is, imperfect. These points will be further discussed in another section.

The hygienic conditions on the line of communication were of a different type. Neither in Maritzburg nor Durban was the water supply above suspicion; in the former, steps had been taken to improve the supply and an installation of Berkefeld filters (originally destined for Ladysmith) had been set up, but the general sanitary conditions were not good. Camps had been formed at Nottingham Road and Mooi River in the previous hot season, and had proved satisfactory, and, indeed, the whole of the camps in occupation during the concentration were fairly good, though no special sanitary arrangements beyond those of the usual standing camp were possible.

(iii.) *The General Incidence of Disease.*—The approximate strength of the troops in Southern Natal (excluding the greater part of the troops on the line of communication) between November 24th and March 2nd was 23,290 Warrant, and N.C.O.'s and men, without allowing for any wastage. Our records of disease consist of those from the field hospitals with the relief force, and those from the stationary hospitals on the line of communication. It is, however, not possible to make any accurate distribution of the strength to correspond with these, but the strength on the line of communication was relatively very small. If we take the total of the cases from the two groups of hospitals, we shall probably be counting the same case twice over in many instances—once as a case of simple continued fever in the field hospital, and again as a case of enteric in the stationary hospital returns—as under the conditions the change of disease was probably never notified to the hospital from which the case came. Hence, there is overlapping of the two sets of returns to an unknown degree. But fig. 4 shows the admissions to the stationary hospitals (solid black), and also those to the field hospitals, and here it is evident that there is no regular relationship between the two sets of returns.

The field hospital returns from the relief force show the following admissions during the period—

Enteric fever cases	12	..	Deaths	—	}	Total cases	867
Simple continued fever ..	855	..		—	}	,, deaths	—
Dysentery cases	957	..	Deaths	3	}	Total cases	1,459
Diarrhœa ,, ...	494	..		—	}	,, deaths	3
Inflammation of intestines..	8	..		—	}		

giving incidence rates per annum per 1,000 for the ninety-nine days between November 24th and March 2nd, of 137 for the continued fevers, and 231 for bowel complaints. Both these incidence rates are under-estimated, as no allowance is made for wastage, or for the small proportion of troops on the line of communication.

The following admissions were returned from the stationary hospitals during the same period:—

Enteric fever cases	142	..	Deaths	59	}	Total cases	228
Simple continued fever ..	86	..	,,	2	}	,, deaths	61
Dysentery cases	345	..	,,	43	}	Total cases	510
Diarrhœa ,, ...	147	.	,,	1	}	,, deaths	47
Inflammation of intestines..	18	..	,,	3	}		

or adding these two sets together to give the total admissions in Southern Natal:—

Enteric fever cases	154	..	Deaths	59	}	Total cases	1,095
Simple continued fever ..	941	..	,,	2	}	,, deaths	61
Dysentery cases	1,302	..	,,	46	}	Total cases	1,969
Diarrhœa ,, ...	641	..	,,	1	}	,, deaths	50
Inflammation of intestines..	26	..	,,	3	}		

If we take the total cases of continued fevers (1,095) on the approximate average strength (23,290) we obtain an annual incidence rate of 173 per 1,000; similarly for dysentery 264, and for all bowel complaints a rate of 312, with case mortalities of 38·3 for enteric fever alone and 5·6 for all continued fevers, 3·54 for dysentery, and 2·54 for all bowel complaints. Here, again, no allowance is made for wastage on the one hand, or on the other for duplicate admissions. But this is probably a maximum rate, as the numbers of Colonial corps and other troops on the line of communication not disembarked at Durban are not included in the average strength used. Hence, the true incidence of the continued fevers lies between 137 and 173 per 1,000 per annum, and is certainly much under that which occurred in Ladysmith.

The differentiation of the components of the fever curve in fig. 4 cannot be adequately shown in a figure. The main points, however, are the extremely small number of cases of enteric fever recorded in the field army returns (twelve), and the enormous preponderance of simple continued fever; while as regards the stationary hos-

pitals, with the exception of a rise in simple continued fever on January 19th (twenty cases), and again during the last fortnight, and a rise—slow at first and then sudden—in enteric fever from the same date, the admissions remained fairly constant without any suggestion of an epidemic outbreak.

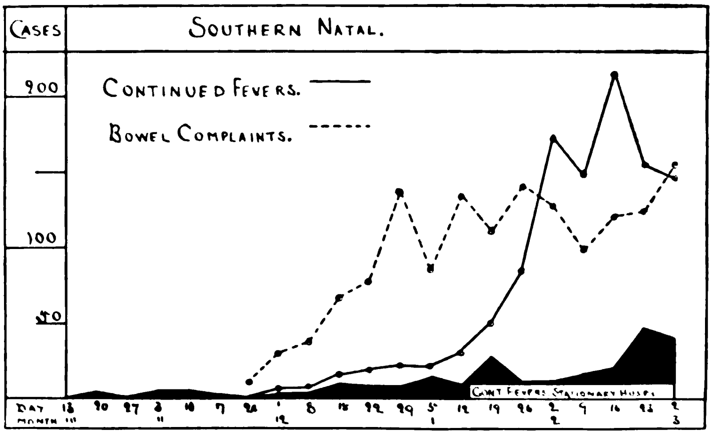

Fig. 4.

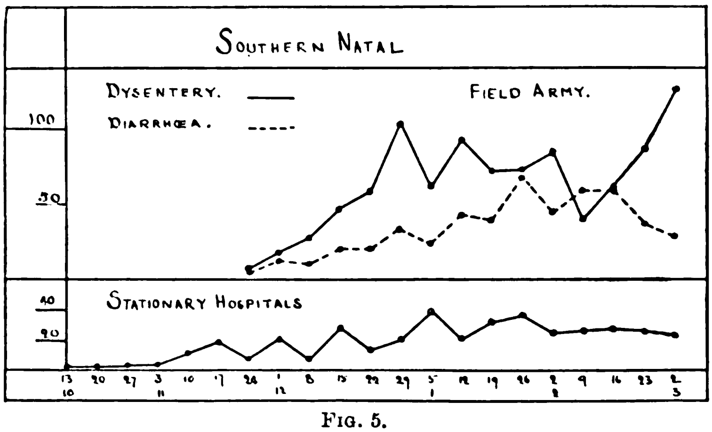

Fig. 5.

Fig. 5 shows the relation of dysentery and diarrhœa in the field army, and of dysentery in the stationary hospitals. In the former, as in Ladysmith, dysentery was the predominant factor.

(iv.) Having then before us the distribution in time of these cases of disease, as shown in the diagrams, one may proceed to enquire

whether there is evidence of any common factor influencing both outbreaks, and on the other hand whether any important differences exist between the curves relating to the two groups of men.

Two features common to both groups are at once evident—the onset of bowel complaints before that of continued fevers, and the long period between the earliest record of continued fever cases and the period of rapid increase in them. Later it will be found that these conditions obtained also in the third great outbreak which began at Modder River; hence their consideration will be deferred till later.

Taking the two Natal groups together, it is possible to find contemporaneous and similar variations in the curves relating to them both in the continued fevers and bowel complaints. But it is questionable how far one is entitled to use these as a basis for discussion. The statistics to begin with are imperfect, and a simple plotting of the actual numbers, as has been done here, does not give the true shape of the curve, nor a sufficient approximation for any valid conclusions regarding the smaller variations. Hence, it is more satisfactory to limit the discussion to the broader results, and to ascertain, as far as the materials permit, in what degree the recorded results conform to the recognised epidemiological characters of the diseases most in evidence.

PHLEBOTOMUS FEVER IN MALTA AND CRETE.

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Historical Summary.

In 1804, Pym, an Army Medical Officer, thus described a type of fever which he had observed in the Mediterranean:—

"The disease generally comes on like other fevers with slight headache, chilliness, shivering, sometimes sickness at the stomach. These symptoms are in a few hours followed by violent pain in the head, confined chiefly to the eyeballs and forehead, pain in the back and in the calves of the legs. The face becomes flushed, and the eyes have a shining, watery appearance, with a slight degree of inflammation, like those of a person half drunk. The skin is dry, the bowels in general bound, tongue foul. The fever ends about the third day."

William Burnett ("A Practical Account of the Mediterranean Fever," 1816) states: "Towards the end of June or commencement of July slight attacks of fever begin to present themselves. The patient complains of considerable headache, with nausea and prostration of strength. The eyes are somewhat suffused and the countenance flushed. The tongue is white and moist. The skin is at times moist and the temperature but little increased, at other times it is dry and the heat pungent. In some cases any increase in the velocity of the pulse is scarcely perceptible. There is commonly constipation and loss of appetite. This is, for the most part, the appearance of the fever of the summer in its first attack. Gastric symptoms are seldom severe, the head being the organ most materially affected."

This clinical picture resembles that of phlebotomus fever which Doerr has given in his work, "Das Pappatacifieber," 1909. This is a three-day fever, which prevails among new-comers to Dalmatia and Herzegovina from May to October. It is seldom or never fatal, but 40 per cent. of those who have recently arrived in these districts may be attacked.

The British medical annals of Malta from the earliest periods, as will be hereafter shown, contain accounts of a similar febrile illness which has affected a large proportion of our troops during their first hot weather in this island.

It is necessary to consider the incidence and death-rate of

"total continued fevers," since, until the last decade, the identification and classification of the different infections were imperfect. Under "total continued fevers," enteric, Malta, and phlebotomus fevers have been grouped. Malarial fevers, other than imported cases, may be almost entirely excluded. Endemic ague has been of great rarity in the civil population, and even more so among the troops. The Anopheles is found in one remote valley only. The Stegomyia, on the other hand, is not uncommon throughout the whole island. In the earlier part of last century the occurrence of yellow fever was recorded, and even as late as 1881, 69 cases of "bilious remittent fever," with 6 deaths, were included in the *Army Medical Report*. Knowing, as we do, that this term was too often used as a euphemism for yellow fever, the prevalence of such an outbreak, in an island almost free from malaria, would appear to incriminate the *Stegomyia fasciata*. In the group "total continued fevers" of the older statistics, the case mortality has fallen far below that of enteric fever, 12 per cent., of Malta fever 3 per cent., or of yellow fever 28 per cent. It must be allowed, therefore, that there were many cases of some milder infection among the "total continued fevers" to occasion such a diminution in the fatality. Reference to Table I. makes it clear that some such cause has been at work. Less than 2 per cent. of febrile ailments have proved fatal in the period 1817-1909.

TABLE I.

Periods of years	Aggregate annual strength	Admissions all continued fevers	Deaths all continued fevers	Ratio of admissions all continued fevers per 1,000 mean annual strength	Ratio of deaths all continued fevers per 1,000 mean annual strength	Case mortality per cent.
1817 to 1836 ..	40,826	7,078	118	173	2·9	1·65
1837* „ 1856 ..	47,961	10,772	107	224	2·2	1·00
1849* „ 1859 ..	33,810	8,606	88	255	2·6	1·02
1859 „ 1909 ..	311,566	50,947	985	164	3·16	1·93

* Part of the same period is covered by these figures. No other statistics, 1857-1858, are available.

We conclude that the cause of this low death-rate was due to annual summer epidemics of phlebotomus fever.

We may obtain some indication of the extent of these outbreaks by comparing the seasonal prevalence of the "total continued fevers" of the earlier years with that of Malta and enteric fevers gained by recent experience. (Chart 2.)

In the manuscript Quarterly Summary (preserved in Principal Medical Officer's Office, Malta), March 21, 1822, to June 20, 1822, we find :—

"The disease which claims our most particular attention is the 'continued or summer fever' which is peculiar to this climate and which during the latter part of the quarter has been very prevalent. Newcomers are predisposed. The cases generally are mild." The uneven distribution is thus shown. In the 80th Regiment there were 42 cases, while in the Artillery there were but 2. In the following quarter, June to September, 1822, 355 admissions for fever are recorded. "Usually the fever was cut short on the second or third day, while convalescence was established by the end of the third or the beginning of the fourth day. Out of 59 cases in the 85th Regiment, 12 only were protracted beyond the eighteenth day." The incidence varied greatly in the different units. In the 80th Regiment there were 190 admissions; in the Artillery 14 only. Table II. shows the seasonal prevalence by months. The epidemic of 1822 prevailed June to October. There were 596 cases and 13 deaths. Fatality, 2·18 per cent.

In the Annual Report of 1823 it is stated that the leading symptoms of the fever during the early part of the summer were severe frontal headache. Later in the year liver symptoms, resembling yellow fever, were by no means infrequent. It is seen that the greater number of admissions in 1823 occurred in the months June to October, but the epidemic was less extensive; 304 cases, 3 deaths. Fatality, 1 per cent.

In 1824 there was a rise in the admissions to 651 with 12 deaths. Fatality, 1·84 per cent. July, August, and September were the months which gave the largest proportion of cases. It is remarked that in the 95th Regiment, which had recently arrived in the Command, 294 febrile cases occurred in June to September, 1824. It will be noted that in 1824 the curve of continued fever reached a great height, only exceeded during the Crimean War.

The low case mortality of the fevers in these years indicates that they were not all instances of the severer infections. And as it has been remarked that many ended on the second or third day, and were prevalent during the summer, it is reasonable to suppose that phlebotomus fever was epidemic.

We read in the Annual Report for 1829 that there were only 164 cases of "common continued fever," with one death, and that "the common fever of Malta is generally very easily managed. Typhoid and typhus fevers are almost unknown. The most urgent

symptom is headache." Chart 1 shows that the incidence and mortality of continued fevers were less that year than in any year up to 1907.

In 1831 we see a marked rise in the curve, but it is stated: "The fevers of this year have not shown any strongly marked prevalence. They have been generally ephemeral. As usual, the proportion of fever in Floriana has been much greater than in any other barracks. Ephemeral fevers have been more prevalent in the 73rd Regiment than in any other. There were 114 cases, although its strength was only 501," which equals an incidence of 227 per 1,000.

During the years 1832, 1833, 1834, according to Davy ("Diseases of the Army," 1862), "fever was unusually prevalent in Malta, not amongst the inhabitants, nor amongst the troops generally, but confined to one or two localities and to the regiments quartered there."

"In 1832 it was principally confined to the 42nd Regiment stationed at Floriana. The disease was mild, of short duration, almost ephemeral, and hardly needing any medical treatment."

"In 1833 the majority of cases occurred in the same Regiment and in the 7th quartered at Cottonera. These, too, were of mild character. The summer fever approaches the pure ephemera in many instances, to commonly terminate in health in three or four days. Its invasion is sudden and generally begins with some severity of symptoms, especially headache, not a little alarming to those who have had no experience of the disease. There is also usually pain in the back and limbs, the skin is hot and the tongue foul. This form is most prevalent in Malta and the Ionian Islands, and the countries bordering the Mediterranean, and has been called the "summer fever of the Mediterranean."

In 1840 and 1841 may be seen an abrupt rise in the "continued fever" curve without a corresponding increase in the mortality. Reference to Table II. indicates that the excess of admissions belongs to the months June to September. It may be inferred they were chiefly of the summer type of febricula, now known to be phlebotomus fever, since the case mortality was only 0·14 and 0·5 per cent. respectively.

The rise in the "continued fever" admission-rate in 1844 was due to the increased prevalence during the months June, July, August and September.

No more detailed information is obtainable until the Crimea period, when the summer fevers attacked many of our young troops

on their way to the Front. In the summer of 1855, during July, August and September, there were 375 admissions, though the average strength of the garrison for that year was only 1,741. There was the enormous incidence of "continued fever" of 340 per 1,000 of strength per annum.

Next year the garrison had swollen to 7,239, and we find recorded no less than 1,986 attacks, during the months June to October, among all this susceptible body of men recently arrived in the Island, with a total continued fever-rate for 1856 of 300 per 1,000.

In 1857 a drop to 127 per 1,000 took place; the maximum incidence was in July.

In 1858 the total continued fever-rate had again mounted to 201 per 1,000, 707 admissions being returned in the period June to October, 1858. Similarly, we see that the summer months of 1859 and 1860 were the fever months. (Table II.)

On p. 488 of the Report of the Sanitary Condition of the Army, 1858, it is stated that the aggregate annual strength of Malta, 1817-1836, was 40,826. "Continued fevers," 1817-1836, caused 7,078 admissions and 118 deaths, or an average annual admission-rate for continued fevers of 173 per 1,000, and a death-rate of 2·9 per 1,000. The case mortality was 1·65 per cent.

The aggregate annual strength, 1837-1856, was 47,961; "continued fevers" caused 10,772 admissions and 107 deaths, giving the ratio per 1,000 of mean strength of 224 admissions and 2·2 deaths. The case mortality was 1 per cent.

In the Report of the Sanitary Commission, 1863, the total aggregate strength of the troops in Malta from April 1st, 1849, to March 31st, 1859, is given as 33,810. The total number of admissions for "continued fever," was 8,606, and the deaths 88; that is an admission-rate of 255 per 1,000 mean annual strength, and a death-rate of 2·6 per 1,000 mean annual strength. The case mortality was 1·02 per cent.

In the Report of the Barrack and Hospital Commission, Mediterranean Stations, 1863, pp. 97-99, while reviewing the prevailing diseases of Malta, it is stated that: "During the entire period which has elapsed since the first hospital records were kept in Malta the prevailing type of fever has been common continued." Out of 22,969 cases 21,122 have been registered thus: "Many of the cases have been very slight and mild, passing off in a day or two. The month of July of each year furnishes the largest number of admissions. The months July, August, and September are the fever months." "Floriana affords the largest number of

admissions and deaths from fever. Intermittent fevers have been so rare as to make it probable that they were imported."

From 1859 onward we are in possession of the more detailed information given in the Army Medical Reports which have been issued yearly since that date.

Table III. shows the nomenclature and classification adopted. Under the heading "Simple continued fever" the greatest number of febrile ailments has been returned. This group has contained Malta fever, the milder attacks of enteric fever, and phlebotomus fever. The term "Febricula" was employed for some years. As no mortality has been registered under it, it may be presumed that the cases were chiefly of the mild pyrexial type, and probably consisted largely of phlebotomus fever.

The year 1859 is marked by a high admission-rate and a high mortality. The reason assigned in the "First Annual Report," dated that year, was the large proportion of young soldiers who had recently arrived from England. The highest admission-rate was noted in a regiment which had disembarked in May. In Table II. it is seen that May to October were the fever months, and 1,177 attacks are recorded in that period (*vide* Chart 1 and Table III.).

The year 1860 was somewhat more healthy, though there were 876 cases of continued fever admitted in the months of June to September. The 2nd Battalion of the 22nd Regiment arrived in May, and in the next four months gave 169 cases, with one death. It was quartered in the Floriana barracks (*vide* Tables II. and III. and Chart 1).

In 1861 there was a further reduction in the prevalence of fevers; but the 1st Battalion of the 22nd Regiment, which had arrived in the middle of 1860 and replaced its linked Battalion, the 2nd 22nd in Floriana barracks, suffered much—279 cases with 3 deaths. The increase in the fever prevalence began to show itself in excess in June, attained its maximum in September, but did not fall to the average till December.

In 1862 it was stated that Floriana was still the centre of infection. The regiment quartered there gave the largest number of admissions.

The low febrile admission and death-rates in 1863 were remarkable. It is stated in the "Report" that the continued fever cases were of mild character.

On p. 504 of the Army Medical Report, 1861, published in 1863, Assistant-Surgeon J. A. Marston, M.D., describes "Simple con-

tinued, ephemeral, febricula or Maltese fever." The following is an abbreviated account: "The latter is a term by which a short and non-dangerous fever of a continued form is characterised alike by the medical men and their patients. It lasts generally from three to five days and more rarely seven days. During the years 1855-6, when a large body of young troops were temporarily stationed here *en passant* for the Crimea, I had the opportunity of observing 100 cases. Newcomers, particularly persons under 25, are liable to suffer from it. It is incidental in the spring, summer, and commencing autumnal months. The patient complains of shivering, weariness, headache, muscular pains, anorexia, thirst. This is rapidly followed by pyrexia, a pungently hot skin, constipation, pain in the eyeballs, which are tender on pressure. Occasionally, though very rarely, there is delirium at night. The disease generally terminates if mild in about seventy-two hours. Relapses occurred in about 15 per cent. at indefinite periods. . . .

"Of late years it has seemed to me that the prevalence of this three-day fever has considerably diminished, while other febrile diseases of a severer character and longer duration have made their appearance. Fever of longer duration, five to seven days, is also more common than it was. The Civil Surgeons practising here consider that a very marked change has taken place in the type of fevers generally. They are in the habit of referring the date of such alteration to the period of the Crimean War. Typhoid and fevers of long duration appear to be more common than they were six or eight years ago." The increase in the case mortality seen on Table I., p. 143, indicates that this surmise was correct.

It is noted in the Army Medical Report, 1864, that the greatest incidence of continued fevers which had risen again occurred in the months June to September. The 1st Battalian 22nd Regiment, which had suffered so severely in 1861, had the lowest rate, although stationed in the Floriana barracks of bad repute.

In the Report of 1865 it is remarked: "Simple continued fever as usual is most prevalent from June to September inclusive. The 29th and 84th Regiments, which arrived on July 1st and middle of April, gave the largest number of cases."

In 1866 fevers were prevalent from June to September. The highest rates occurred among recent arrivals. The 60th, which landed in March and occupied the now notorious Floriana barracks, had more than one quarter of their strength attacked. With few exceptions the fever was of very mild type. In this Report the sequelæ of the *Micrococcus melitensis* infection are mentioned.

Boileau, on p. 479, describes "Malta fever" as a pyrexia with sudden onset terminated in seven days by lysis. Frontal headache, white tongue are the chief symptoms. There is no rash. The average stay in hospital is eight days only. The *M. melitensis* infection he terms "gastric remittent fever."

The year 1867 was remarkable for the high incidence and mortality of fevers. Thirty-six deaths were returned under the heading of "simple continued fever" and three under that of enteric. It is stated that June to September was the period of most extensive prevalence.

The months June to September in 1868 were those when the largest number of fever admissions occurred.

In 1869 it is related that there were two regiments in their first summer on the Island. In one the fever admission-rate was 449 per 1,000, and in the other 269 per 1,000. The excess occurred from June to September. "Febricula" now appears for the first time in the returns. There were 151 cases thus designated (*vide* Table III.). The mortality in 1869 was very small, 0·6 per 1,000 (*vide* Chart 1 and Table III.).

It is observed in the Report of 1870 that the attacks of "simple continued fever" are often followed by rheumatism; 196 cases of "febricula" are recorded.

In 1871, 202 of the pyrexial cases were shown as "febricula."

In the 1872 Report the quarterly prevalence is thus shown :—

	"Simple continued fever"		"Febricula"	"Enteric"	
1st quarter ..	38 admissions,	1 death ..	25 admissions ..	4 admissions.	
2nd " ..	113 "	2 deaths ..	98 " ..	5 "	1 death.
3rd " ..	367 "	3 " ..	295 " ..	7 "	5 deaths.
4th " ..	153 "	3 " ..	41 " ..	16 "	5 "

The febrile diseases were much more prevalent in the regiments which arrived in the Island during the year than in those of longer service in it. In the battalion which came from England fever was more prevalent than in three which arrived from Gibraltar. The period of greatest prevalence of "simple continued fever" and "febricula" was the hottest season of the year, July and August. The 13th Foot from Gibraltar occupied Floriana barracks; 137 cases of "simple continued fever," 38 "febricula," and 6 enteric with 4 deaths are recorded against them, though their strength was only 573. The 74th, also from Gibraltar and quartered in Verdala, gave 163 cases, 3 fatal, of "simple continued fever." Their strength during the summer was 690. The regiment which had come from England was quartered at Fort Ricasoli, Zabber Gate, and Salvatore Barracks; 115 admissions for "simple continued

fever" with one death; 214 for "febricula"; 4 for enteric, with one death, occurred. Their strength was 612. On Chart 1 it will be noted that the total fever curve reached a high level in 1872, apparently due to the large proportion of susceptible individuals in the garrison among the four regiments which landed on the Island that year.

In 1873 many of these recent arrivals had become immune, indicated by the fall in the fever curve. There were, nevertheless, 346 cases of "simple continued fever" with 4 deaths and 429 cases of "febricula." Some of the Malta fever admissions were returned as "remittent fever."

In the 1874 report there are no entries under the heading of "remittent fever," or "febricula," but 864 "simple continued fever."

Four hundred and four admissions for "febricula," mostly during the second and third quarters of 1875, are recorded in the Report for that year.

It is stated that one-third of the total admissions for fevers in 1876 were cases of "febricula."

In 1877, 209 cases of "simple continued fever" and 2 deaths, and 635 cases of "febricula" were returned.

The "febricula" admissions in 1878 amounted to 920, the "simple continued fever" to 150, and the enteric to 94. All the deaths, it will be noted, were returned under the latter heading, due to the theory which was maintained for some years that the *M. melitensis* infection was a form of enteric fever. This conception is clearly indicated in Chart 1, where it is seen that the enteric mortality curve coincides with the total continued fever mortality curve from the years 1875-1884. The greatest incidence of fever was observed in two regiments which had recently landed from England: 34 per 1,000 of the whole garrison were attacked with "simple continued fever" or "febricula" in August, 1878, and 29 per 1,000 in July, 1878.

The 1879 Report is notable in being the first in which the data are given for determining the average duration of each case. Only 41 admissions for "simple continued fever" are recorded, but there are 887 for "febricula," and 50 for enteric, with 12 deaths. The average duration of each febrile case (whole group) was 15·6 days. The "febricula," it is stated, was very mild and ephemeral, and prevailed from April to October.

In 1880 the cases returned as "febricula" predominated; 827 were thus shown, and 20 as "simple continued fever." The

incidence was greatest in two regiments which had recently arrived.

In 1881 the term "febricula" was not made use of, but there were 706 admissions under the heading of "simple continued fever." During the autumn dengue made its appearance in an epidemic form over the Island. The naval and civil population were more severely affected than the military, among whom forty-six attacks occurred. The joint pains and erythematous rash were marked features of the epidemic, which subsided at the beginning of December.

In 1882 "simple continued fever" and "febricula" accounted for 343 and 173 admissions respectively. The greatest incidence was observed among young soldiers who had recently joined the garrison.

In 1883, 260 cases of "simple continued fever" and 184 of "febricula" were recorded.

In 1884 Malta fever was shown as "remittent" fever—86 cases. There were 617 admissions for "simple continued fever"; these were generally mild.

In 1885 it will be seen from Chart 1 that there was a sudden upheaval in the total continued fever curve. Some of these cases of Malta fever were returned under the heading of "remittent fever," and others as "simple continued fever," of which 345 are recorded. "Febricula" admissions stand at 495, the majority of which were mild. It will be seen that it is now becoming recognised that Malta fever is distinct from enteric fever; the total fever and enteric mortality curves are becoming separated (*vide* Chart 1 and Table III.).

In 1886 "febricula" was dropped out of the "Nomenclature of Diseases." Of the 730 cases of "simple continued fever" it is said many were light and ephemeral, but a large number were protracted; their average stay in hospital was 27·5 days.

In 1887 the "simple continued fever" cases, though fewer, were severer; average, thirty-four days under treatment.

In 1888, it is stated that many cases of mild febricula are included in the 452 admissions for "simple continued fever"; average duration twenty-seven days.

In 1889, the incidence of "simple continued fever" was lower, but the cases remained longer in hospital, average thirty-nine days. Young soldiers during their first summer were predisposed.

In 1890 the average duration of the 603 cases of "simple continued fever" was twenty-nine days. But it is stated that the

TABLE II.—Malta.

Seasonal Prevalence of 22,788 Cases of Continued Fevers, 1822-94 (vide Chart 2).

Year	Strength	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1822 ..	2,094	17	10	22	19	14	52	139	99	97	63	27	21
1823 ..	1,973	16	18	11	9	11	38	51	45	45	26	12	18
1824 ..	1,860	10	9	9	10	40	37	157	190	106	37	18	21
1838 ..	2,186	..	..	..	23	18	32	58	39	36	17	13	11
1839 ..	2,119	8	8	8	13	20	22	43	48	58	46	19	11
1840 ..	2,326	10	16	11	14	33	60	99	118	211	114	36	14
1841 ..	2,591	14	23	20	22	27	94	293	156	123	26	20	9
1842 ..	2,143	17	15	16	15	27	61	126	86	59	39	27	15
1843 ..	1,932	20	15	30	41	22	58	75	54	49	24	6	7
1844 ..	1,865	7	11	14	18	12	44	127	96	71	35	15	18
1845 ..	1,852	10	18	19	17	18	29	53	47	52	30	20	16
1846 ..	1,999	16	17	16	18	26	54	52	50	37	25	14	11
1847 ..	2,398	27	10	20	..	..	..	..	..	..	..	..	..
1855 .	1,741	..	..	..	13	20	39	143	55	177	31	39	36
1856 ..	7,239	15	26	19	22	36	339	661	432	401	153	45	36
1857 ..	6,160	26	45	50	42	67	68	211	92	80	31	24	47
1858 ..	4,899	28	40	67	34	41	173	213	133	116	72	37	33
1859 ..	5,310	24	28	32	36	62	229	276	197	248	165	116	69
1860 ..	5,950	60	32	29	..	..	175	313	164	224	..	..	..
1879* ..	4,673	18	14	16	20	35	70	134	103	134	63	51	22
1880* ..	4,673	18	14	16	20	35	70	134	103	134	63	51	22
1881* ..	4,673	18	14	16	20	35	70	134	103	134	63	51	22
1882* ..	4,673	18	14	16	20	35	70	134	103	134	63	51	22
1883 ..	4,611	9	12	17	8	30	40	116	73	90	33	22	13
1884 ..	4,637	16	8	14	25	51	85	98	132	108	48	34	24
1885 ..	4,602	35	19	20	25	94	149	209	156	118	84	34	24
1886 ..	4,736	34	27	30	44	75	111	150	96	75	48	26	25
1887 ..	5,499	16	12	20	22	29	89	136	99	90	23	21	13
1888 ..	6,353	6	9	13	13	18	51	69	82	98	50	36	7
1892 ..	7,847	43	28	27	28	58	143	368	192	218	137	79	138
1893 ..	7,161	126	43	22	33	43	86	198	136	184	106	61	63
1894 ..	7,911	33	27	26	15	32	88	238	162	114	72	103	40
—	Total	715	582	646	659	1,064	2,726	5,209	3,641	3,821	1,789	1,108	827

* Average for four years.

On the addition of the figures showing the Malta and Enteric fever monthly incidence and on multiplying by 1·27 we may obtain a curve of the prevalence of these fevers combined, which coincides with that of the "Total continued fevers" 1822-1894, at the beginning and end of the year. It seems reasonable to assume that the excess of admissions denoted by the "Total fever" line above the combined Enteric and Malta fever curve was in great measure due to "Phlebotomus fever." Under this supposition there were over 11,000 cases of "Phlebotomus fever" in the 22,788 continued fevers, 1822-1894. (*Vide* Chart 2.)

Seasonal Prevalence of "Simple Continued Fever" and Pyrexia of Uncertain Origin, 1899—1909.

Year	Strength	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Average 1899-1905	8,254	15	11	19	23	32	164	308	212	181	69	23	13
1905 ..	8,294	13	6	14	28	59	359	338	193	206	60	17	6
1906 ..	6,661	6	3	3	7	13	114	185	68	61	30	15	3
1907 ..	5,700	1	2	3	13	11	40	115	73	41	21	2	1
1908 ..	6,030	3	0	1	11	15	71	63	79	48	7	2	3
1909 ..	6,285	3	1	1	8	8	34	89	47	40	26	0	..

Seasonal Prevalence of 7,582 Cases of Malta Fever (vide *Chart* 2).

—	—	439	325	404	393	547	654	813	1,073	927	807	628	574

Seasonal Prevalence of 1,112 Cases of Enteric Fever (vide *Chart* 2).

—	—	125	41	40	21	43	86	157	109	159	132	125	74

CHART 1.—Malta, 1814 to 1909.

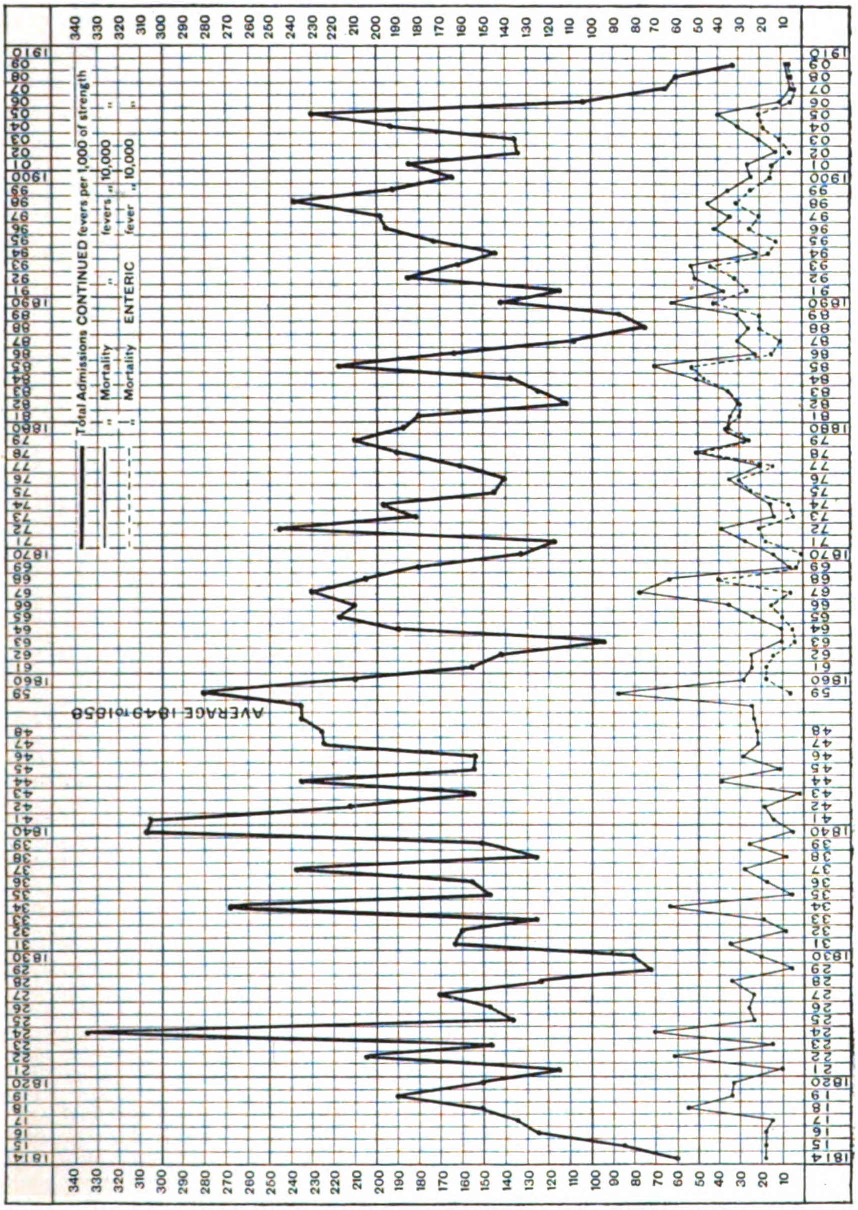

TABLE III.—Continued Fevers. Malta, 1859 to 1909.

Year	Strength	Malta Fever		Remittent Fever		Simple Continued Fever		Febricula		Enteric Fever		Total Continued Fevers		Ratio per 1,000 Strength		
		Admissions	Deaths	Admissions	Deaths	Admissions	Deaths	Admissions	Deaths	Admissions	Deaths	Admissions	Deaths	Total admissions continued fever	Total deaths continued fever	Enteric deaths
1859	5,310	..	..	59	..	1,431	44	..	..	5	3	1,490	47	280	8·85	0·565
1860	5,950	..	..	8	..	1,200	12	..	..	41	11	1,249	23	210	3·86	1·845
1861	6,185	..	..	75	..	838	10	..	..	38	11	951	21	154	3·4	1·78
1862	5,958	..	..	1	..	823	12	..	..	21	9	845	21	141	3·5	1·51
1863	5,757	..	..	..	..	654	4	..	..	5	2	659	6	97	1·04	0·35
1864	5,654	..	..	18	..	1,048	3	..	..	9	3	1,075	6	190	1·08	0·53
1865	5,323	..	..	2	..	1,152	8	..	..	10	5	1,164	13	218	2·45	0·94
1866	5,208	..	..	69	1	1,008	13	..	..	23	6	1,100	19	211	3·64	1·45
1867	4,919	..	..	..	..	1,121	36	..	..	4	3	1,125	39	229	7·9	0·61
1868	5,377	..	..	..	..	1,064	12	..	..	42	22	1,106	34	206	6·35	4·1
1869	5,027	..	..	..	..	734	2	151	..	19	1	904	3	180	0·6	0·2
1870	4,799	..	..	5	1	430	5	196	..	6	..	633	6	132	1·25	..
1871	4,977	..	..	9	1	357	4	202	..	16	9	585	14	117·5	2·8	1·805
1872	4,855	..	..	21	..	650	9	453	..	29	10	1,183	19	246	3·92	2·06
1873	4,627	..	..	52	2	346	4	429	..	14	2	841	6	181·5	1·33	0·43
1874	4,411	..	..	..	..	864	3	..	..	5	3	869	6	197	1·36	0·68
1875	4,506	..	..	32	..	205	..	404	..	25	11	666	11	145	2·44	2·44
1876	4,539	..	..	20	1	569	2	..	..	49	13	638	15	141	3·3	2·86
1877	5,556	..	..	13	..	209	2	635	..	29	9	886	11	159·5	1·98	1·62
1878	6,201	..	..	..	..	150	..	920	..	94	32	1,173	32	189·5	5·16	5·16
1879	4,668	..	..	1	..	41	..	887	..	50	12	978	12	209	2·57	2·57
1880	4,885	..	..	..	..	20	1	827	..	53	17	918	18	188	3·69	3·48
1881	4,553	..	..	69	6	706	..	..	..	46	13	821	19	180	3·42	2·86
1882	4,619	..	..	5	..	343	1	173	..	78	13	521	14	112·5	3·03	2·82
1883	4,611	..	..	7	..	260	..	184	..	120	17	571	17	124	3·69	3·69
1884	4,637	..	..	86	1	617	..	..	..	94	22	797	23	138	4·98	4·75
1885	4,602	..	..	72	3	345	5	495	..	93	24	1,005	32	218·2	6·95	5·21
1886	4,736	..	..	8	1	730	2	..	..	34	8	772	11	163	2·32	1·69
1887	5,499	..	..	13	5	570	7	..	..	14	5	597	17	108·5	3·09	0·91
1888	6,353	..	..	2	..	452	3	..	..	18	12	470	15	74	2·48	1·89
1889	6,516	..	..	4	2	545	10	..	..	18	7	565	19	86·8	2·92	1·08
1890	4,659	..	..	..	..	603	9	..	..	60	20	663	29	142	6·23	4·29
1891	7,697	..	..	1	..	840	9	..	..	48	19	891	28	115·7	3·64	2·47
1892	7,847	..	..	..	..	1,369	14	..	..	74	25	1,443	39	184	4·98	3·19
1893	7,161	..	..	121	..	938	5	..	..	101	32	1,160	37	162	5·175	4·46
1894	7,911	..	..	273	1	834	4	..	..	42	12	1,149	17	145 5	2·175	1·52
1895	8,292	..	..	2	2	1,401	13	..	..	23	10	1,426	25	172	3·04	1·2
1896	8,316	..	..	1	1	1,512	15	..	..	49	20	1,622	35	195	4·22	2·41
1897	8,023	279	12	..	..	1,275	..	..	..	34	15	1,588	27	197·9	3·36	1·87
1898	7,390	200	8	..	..	1,509	1	..	..	62	24	1,771	33	239·6	4·46	3·24
1899	7,425	275	9	..	..	1,107	..	..	..	41	17	1,423	26	191·6	3·50	2·29
1900	8,140	158	8	..	..	1,158	..	..	..	31	11	1,347	19	165·5	2·33	1·35
1901	8,136	253	9	..	..	1,205	..	..	..	41	11	1,499	20	184·2	2·45	1·35
1902	8,758	155	6	..	..	981	..	..	..	38	4	1,174	10	134	1·14	0·46
1903	8,903	404	9	..	..	781	..	..	..	18	8	1,203	17	135·1	1·90	0·9
1904	9,120	320	12	..	..	1,350	..	..	..	79	16	1,749	28	191·8	3·07	1·75
1905	8,294	643	6	..	..	1,199	..	..	..	64	17	1,906	33	229·8	3·98	2·05
1906	6,661	163	4	..	..	504	..	..	..	14	3	681	7	102	1·06	0·45
1907	5,700	11	1	..	..	340	..	..	..	14	1	365	2	66·5	0·36	0·18
1908	6,030	5	..	..	..	354	..	..	..	5	2	362	2	60·5	0·33	0·33
1909	6,285	1	..	..	..	256	..	..	..	11	2	268	2	42·2	0·35	0·35
—	311,566	2,867	84	—	—	to 30.11.09	—	—	—	2,951	584	50,947	985	—	—	—

Case mortality of total continued fevers .. .. 1859 to 1909 = 1·93 per cent.
,, ,, continued fevers, *less* enteric .. ,, ,, = 0·83 ,,
,, ,, enteric fever .. .. .. ,, ,, = 19·8 ,,
,, ,, Malta fever .. .. .. 1897 to 1909 = 2·93 ,,

CHART 2.—Malta.

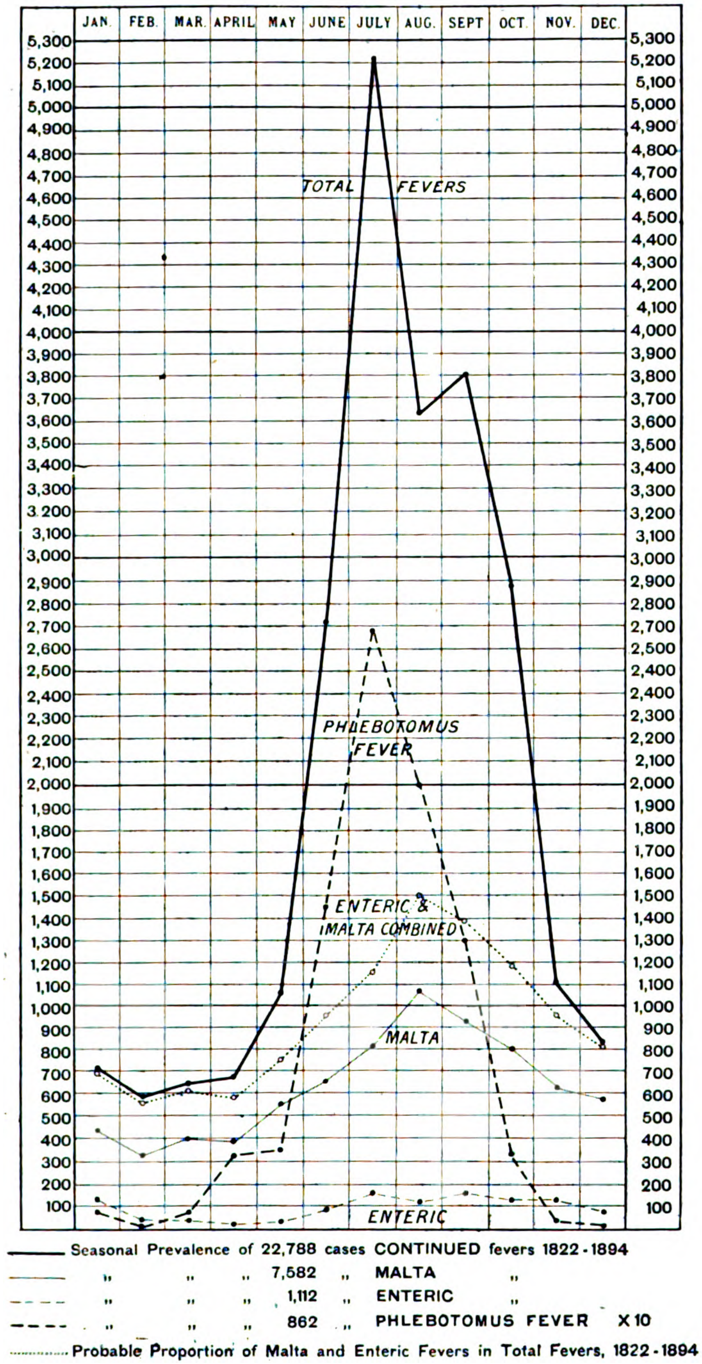

TABLE III.—Continued Fevers. Malta, 1859 to 1909.

Year	Strength	Malta Fever Admissions	Malta Fever Deaths	Remittent Fever Admissions	Remittent Fever Deaths	Simple Continued Fever Admissions	Simple Continued Fever Deaths	Febricula Admissions	Febricula Deaths	Enteric Fever Admissions	Enteric Fever Deaths	Total Continued Fevers Admissions	Total Continued Fevers Deaths	Ratio per 1,000 Strength: Total admissions continued fever	Ratio per 1,000 Strength: Total deaths continued fever	Ratio per 1,000 Strength: Enteric deaths
1859	5,310	..	..	59	..	1,431	44	..	..	5	3	1,490	47	280	8·85	0·565
1860	5,950	..	..	8	..	1,200	12	..	..	41	11	1,249	23	210	3·86	1·845
1861	6,185	..	..	75	..	838	10	..	..	38	11	951	21	154	3·4	1·78
1862	5,958	..	..	1	..	823	12	..	..	21	9	845	21	141	3·5	1·51
1863	5,757	..	..	..	..	654	4	..	..	5	2	659	6	97	1·04	0·35
1864	5,654	..	..	18	..	1,048	3	..	..	9	3	1,075	6	190	1·08	0·53
1865	5,323	..	..	2	..	1,152	8	..	..	10	5	1,164	13	218	2·45	0·94
1866	5,208	..	..	69	1	1,008	13	..	..	23	6	1,100	19	211	3·64	1·45
1867	4,919	..	..	..	..	1,121	36	..	..	4	3	1,125	39	229	7·9	0·61
1868	5,377	..	..	..	..	1,064	12	..	..	42	22	1,106	34	206	6·35	4·1
1869	5,027	..	..	..	..	734	2	151	..	19	1	904	3	180	0·6	0·2
1870	4,799	..	..	5	1	430	5	196	..	6	..	633	6	132	1·25	..
1871	4,977	..	..	9	1	357	4	202	..	16	9	585	14	117·5	2·8	1·805
1872	4,855	..	..	21	..	650	9	453	..	29	10	1,183	19	246	3·92	2·06
1873	4,627	..	..	52	2	346	4	429	..	14	2	841	6	181·5	1·33	0·43
1874	4,411	..	..	..	..	864	3	..	..	5	3	869	6	197	1·36	0 68
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1878	6,201	..	..	..	..	150	..	920	..	94	32	1,173	32	189·5	5·16	5·16
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1904	9,120	320	12	..	..	1,350	..	..	..	79	16	1,749	28	191·8	3·07	1·75
1905	8,294	643	6	..	..	1,199	..	..	..	64	17	1,906	33	229·8	3·98	2·05
1906	6,661	163	4	..	..	504	..	..	..	14	3	681	7	102	1·06	0·45
1907	5,700	11	1	..	..	340	..	..	..	14	1	365	2	66·5	0·36	0·18
1908	6,030	5	..	..	..	354	..	..	..	5	2	362	2	60·5	0·33	0·33
1909	6,285	1	..	..	..	256	..	..	..	11	2	268	2	42·2	0·35	0·35
—	311,566	2,867	84	—	—	to 30.11.09	—	—	—	2,951	584	50,947	985	—	—	—

Case mortality of total continued fevers .. .. 1859 to 1909 = 1·93 per cent.
,, ,, continued fevers, *less* enteric .. ,, ,, = 0·83 ,,
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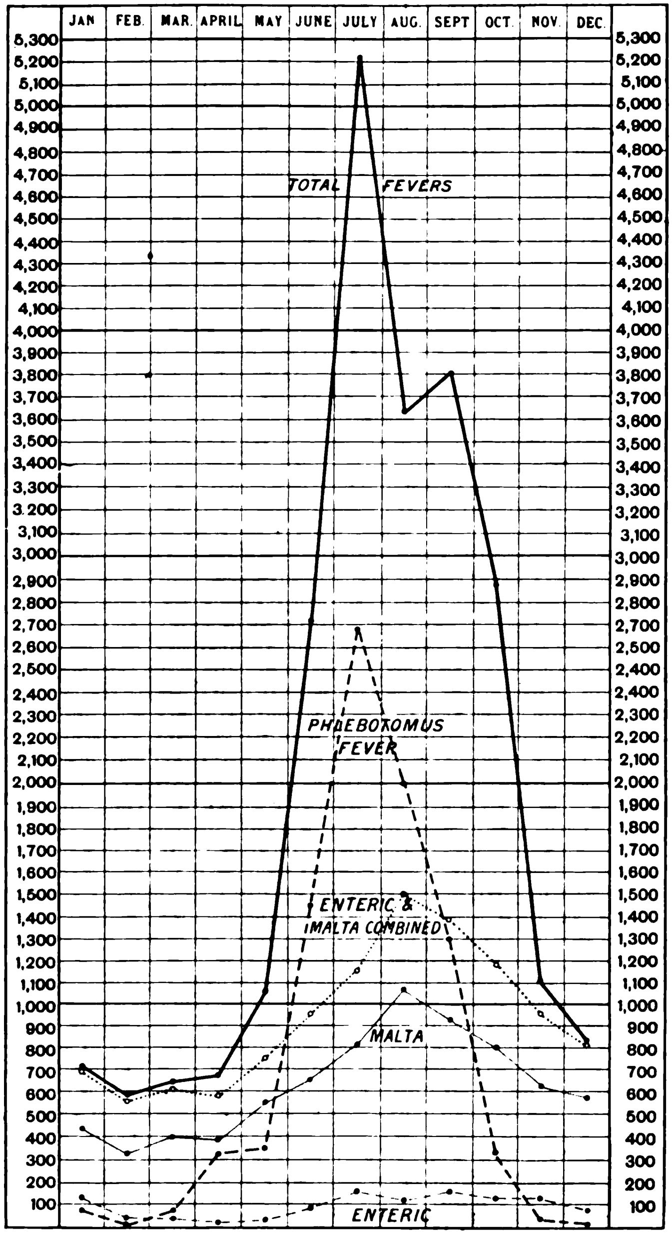
Chart 2.—Malta.



Seasonal Prevalence of 22,788 cases CONTINUED fevers 1822-1894
" " " 7,582 " MALTA "
" " " 1,112 " ENTERIC "
" " " 862 " PHLEBOTOMUS FEVER X10
Probable Proportion of Malta and Enteric Fevers in Total Fevers, 1822-1894

fever varied greatly. Many of the ailments were mild and short; 180 cases of influenza occurred in January and early part of February.

In the 1891 Report, 840 admissions for "simple continued fever" averaged twenty-six days in hospital. It is stated that medical officers concur in thinking that "simple continued fever" embraces more than one disease.

The increase in the admission-rate for "simple continued fever" in 1892 is attributed to the large proportion of young soldiers. Each case averaged twenty-seven days in hospital. There were 1,369 attacks.

In 1893, some of the cases of Malta fever were shown as "remittent fever"—121 admissions—but many were included under "simple continued fever"—938 admissions, with an average of twenty-seven days' treatment. The young soldiers joining during the year were especially attacked.

In 1894, 274 cases of Malta fever were returned as "remittent," but still more were among the "simple continued fever" group; the average duration of each of the 834 cases was twenty-eight days. In the early part of the year there was an outbreak of 126 cases of influenza.

In 1895 all the Malta fever cases were grouped with the "simple continued fevers" except two; consequently the average duration of each of the 1,401 cases of "simple continued fever" was twenty-seven days.

The same arrangement was made in the 1896 Report: 1,572 admissions for "simple continued fever" had an average duration of twenty-six days. It is noted that 4,542 of the troops had resided less than a year on the Island. This afforded an explanation for the increase in the fever incidence.

In 1897, the term "Mediterranean fever" appeared for the first time; 279 cases were thus shown, but many were still included in the 1,275 "simple continued fevers." Commenting on this last class, it is remarked that there are two types of "simple continued fever," one in which there is a high temperature for two or three days, followed by a rapid recovery, and another of more prolonged course, the temperature in which oscillates about 102° F. for seven to ten days, when a gradual recovery ensues. August and September are the months when they are most prevalent.

Hughes in his treatise on Malta fever, which was published in 1897, states that a large number of cases of pyrexia of short duration occur side by side with the other continued fevers of Malta.

The year 1898 was marked by high fever admission and death-rates.

Table II. gives the monthly average of cases of "simple continued fever," 1899 to 1905, copied from p. 223, part vii., "Report of the Commission on Mediterranean Fever." It is seen that in June the epidemic begins; a sudden rise to 164 from 32 appears. The figures are highest in July and become much reduced in October. On p. 138 of the same Report it is stated that 75 per cent. of the 4,311 cases of "simple continued fever" admitted during the four years 1902 to 1905, were under ten days in hospital. In 1906 the proportion was even greater. No less than 86 per cent. of 504 cases necessitated a stay in hospital of less than ten days. It is remarked that "simple continued fevers" exhibit a very decided, it might be called an abrupt, seasonal prevalence. A sudden increase occurs in June, reaches its highest point regularly in July, decrease commences in August, and a drop almost as sudden as the rise in June is observed with the close of September.

A unit may have an unusual number of "simple continued fever" cases without any corresponding prevalence of Malta fever.

The history of the 2nd Battalion Essex Regiment which is given on p. 142, part vii., "Report of the Commission on Mediterranean Fever," is instructive. This Regiment landed in Malta on April 28th, 1904, 698 strong. In June 9·6 per cent. of their strength were admitted with "simple continued fever"; in July, 35 per cent.; August, 5 per cent.; September, 6·3 per cent.; October, 6 per cent. That is, no less than 55 per cent. of this Regiment were attacked with "simple continued fever" during the first summer of their residence in Malta. In the following year only 19 per cent. of their number contracted the ailment. Moreover, most of the cases came from the drafts of recruits which arrived after the 1904 epidemic.

We find a pertinent remark in the Annual Report for 1904, where it is stated that most of the 1,350 cases of "simple continued fever," the mean duration of which was nine and a half days, came from troops in barracks, and not from those in camps. They were generally of mild character. There has been a similar experience in Crete.

In the Annual Report for 1905 it is mentioned that the subject of "simple continued fever" requires further study. Attention is drawn to the period of prevalence during the hottest months and the presence of gastric disturbances in some cases. There were 1,199 admissions classed as "simple continued fever"; the average stay of each case in hospital was 10·6 days.

In 1906 the mean duration of each of 508 cases of "simple continued fever" was 9·4 days; they are reported as trivial. It is related that "sand-flies" were much more troublesome than mosquitoes in some of the barracks and married quarters in 1906. The seasonal prevalence is shown in Table II.; June to September was the period of the epidemic.

Captain Crawford Kennedy, R.A.M.C., in a minute submitted to the Mediterranean Fever Commission, December 16th, 1905, defined "simple continued fever" as of the nature of influenza, coming on with severe pains in the head and limbs, pyrexia 101° to 104° F., and lasting one to four days. He noted that it attacked newcomers and was epidemic during June, July and August, and that it occurred irrespectively of exposure to the sun. He gave the incubation period as six to ten days. He regarded it as infectious. He believed it to be a specific disease, though some blood cultures he had made had given negative results.

Notwithstanding the virtual extinction of Malta fever in 1907, there were 340 admissions for "simple continued fever"; each case averaged 9·1 days in hospital. All except forty-one occurred in the months May to September inclusive. It is stated that none of these showed signs of being aberrant cases of Malta fever, nor did they subsequently develop this disease.

Lieutenant-Colonel J. J. Gerrard contributed an important paper on simple continued fever in Malta to the JOURNAL OF THE ROYAL ARMY MEDICAL CORPS, November, 1907. Eighty-five per cent. of 172 cases observed by him were less than ten days in hospital. Serum examinations were conducted in every instance, sometimes more than once, with uniformly negative results. He draws attention to the frontal headache, large, coated tongue, constipation, slow pulse, and gives representative temperature charts.

Captain P. F. Maratt, in the JOURNAL OF THE ROYAL ARMY MEDICAL CORPS, September, 1909, narrates his investigations he made in an outbreak of simple continued fever in 1907. A temperature of 102° to 103° F., a slow pulse, pains in the back and head, furred tongue, constipation, and vesicles on the palate, were the chief symptoms. In the majority of instances they were under twelve days in hospital. He gives spot maps, in which the excessive prevalence in a particular block of barracks, C. Floriana, is shown. The epidemic was confined to the summer months.

Table II. shows the seasonal prevalence of "simple continued fever" during the year 1908. There were 354 admissions, averaging ten days in hospital. The Malta fever and enteric fever

morbidity had fallen to five cases of each only. All but twenty seven of the "simple continued fevers" occurred in the months May to September inclusive.

A survey of this historical evidence renders it clear that:—

(1) There have been outbreaks of a short fever every summer in Malta since the earliest military annals.

(2) This fever is specific, for immunity is afforded by a previous attack. With much monotony it is yearly recorded that the recent arrivals are the sufferers.

(3) This fever is not an abortive typhoid infection, for if it were the monthly prevalence of the two would agree, but this is not so. (See Table II and Chart 2.)

(4) This fever is not aberrant Malta fever. If this were so, the monthly admission-rate of "simple continued fever" would vary with the monthly admission-rate of Malta fever. Table II. shows that this is not the case. There are certainly three times as many admissions for Malta fever in August as in February. But there are fifty or more times as many admissions for "simple continued fever" in the former as in the latter month.

(5) Malaria has not been endemic in Malta among the troops.

Consideration of the case mortality alone in the "total continued fevers" points to the conclusion that this group contains some other infection milder than enteric or Malta fevers in addition to these. We know that between 2 and 3 per cent. of cases of Malta fever die, and between 12 and 14 per cent. of enteric fever. But even before 1859 less than 1·7 per cent. of the "total continued fever" admissions ended fatally; and since that year it has not often exceeded this ratio and has been frequently less. The case mortality of "total continued fevers," 1859 to 1909, is 1·93 per cent. Therefore, as in every year there have been included many instances of both Malta and enteric fevers in the group "total continued fevers," it is necessary to admit the inclusion in the class of "total continued fevers" of a considerable number of cases of a benign infection in order to reduce the fatality from, say, 3 to 10 per cent. to 1·93 per cent.

FLEMING'S METHOD OF SERUM DIAGNOSIS IN SYPHILIS WITH THE RESULTS OF ONE HUNDRED AND FORTY-ONE CASES.

By Captain T. H. GIBBON.
Royal Army Medical Corps.

The Bordet-Gengou reaction described in the *Annales de l'Institut Pasteur*, 1901, T. xv., p. 289, was the forerunner of many other experiments carried out on the same lines, and resulted eventually, as far as syphilis is concerned, in what is known as the Wassermann serum diagnosis of syphilis. Following on this first publication made by Wassermann, Neisser, and Bruch in 1906, there has been a large amount of work done on the subject, mainly in Germany and France, and many new features have been brought to light, and many modifications of the original test have been tried.

In the June number of the Royal Army Medical Corps Journal, 1907, Lieutenant-Colonel C. Birt gave a general outline of the Bordet-Gengou reaction, and of Wassermann's application of it to syphilis, and to show the general idea of the present test it is necessary first to recapitulate to some extent what he has written there.

Experiment 1.—If a normal guinea-pig's serum be added to a suspension of washed rabbit's red corpuscles, no alteration takes place in these red cells, but if we inject a guinea-pig at intervals of ten days on three or four occasions with rabbit's red cells, and then take this guinea-pig's serum and mix it as before with the suspension of washed rabbit's red cells, it will be found that hæmolysis of the red cells takes place.

The explanation of this experiment is, the red cells of the rabbit injected into the guinea-pig are the antigen, antigen being the term used to indicate an agent of an organic character which when introduced into the body leads to the development within the serum, &c., of new substances. In this case the antigen leads to the development of a specific antibody or amboceptor hæmolytic for rabbit's red cells.

This antibody, or amboceptor, belongs to Erlich's third order of receptors, that is, it is capable of attaching itself, as it were, at one

of its ends to the antigen, and at the other to a substance which is found normally in the serum, and is not specific, called the complement, or alexine. This complement is destroyed by heating serum at a temperature of from 55° to 60° C. for half an hour, and the necessity of its presence can be shown by the following experiment.

Take some of the specific guinea-pig's serum and heat it at 56° C. for half an hour, and then mix it with the suspension of rabbit's red cells. The serum is now minus its complement, and, although the specific antibody is not destroyed by this heat, it will be found that there is no hæmolysis, thus:—

Specific amboceptor, hæmolytic for rabbit's red cells + washed rabbit's red cells = no hæmolysis.

But now take some serum, which contains complement, but no hæmolytic amboceptor, from a normal guinea-pig, and add it to the above mixture; it will be found that hæmolysis takes place, thus:—

Specific amboceptor, hæmolytic for rabbit's red cells + complement + rabbit's red cells = hæmolysis.

Experiment 2.—It is found that the serum of a normal guinea-pig has no effect on the cholera vibrio, but if cholera vibrios are injected into a guinea-pig at intervals, as was done with the rabbit's red cells in the first experiment, it will be found that the serum of the guinea-pig has developed the power of destroying the cholera vibrio when the two are mixed together. In this case, the antigen is the cholera vibrio and the specific amboceptor or antibody produced is the specific bacteriolysin for cholera vibrios. All the lysins being receptors of the third order, it can be shown, as in the first experiment, that complement is necessary. Expressed again as an equation:—

Antibody specific for cholera vibrios + complement + cholera vibrios = lysis of the cholera vibrios.

The Bordet-Gengou reaction, now, is the combination of these two experiments, and is as follows:—

Five elements are necessary: (1) The specific antigen, in this case cholera vibrios; (2) specific antibody, capable with complement of bringing about lysis of the cholera vibrios, *i.e.*, the serum of the guinea-pig treated by injections of cholera vibrios and heated at 56° C. for half an hour to destroy the complement; (3) complement, the serum of a normal guinea-pig; (4) specific antibody hæmolytic for rabbit's red cells, *i.e.*, the serum of a guinea-pig treated by injections of rabbit's red cells, and subsequently heated at 56° C. to destroy the complement; (5) washed rabbit's red cells.

The first three are mixed together and incubated for an hour at 37° C.; the result is that the antigen, the specific antibody and the complement become joined together, and the complement is used up. Now add Nos. 4 and 5 and incubate at 37° C. for another hour, and it is found that no hæmolysis has taken place, as there is no complement to satisfy the hæmolytic amboceptor. In other words:—

Specific antigen	+	specific antibody	+	complement	+	specific antibody, hæmolytic for rabbit's red cells	+	rabbit's red cells	=	no hæmolysis.

Now suppose we replace No. 2 by a heated normal serum, containing no specific antibody for the cholera vibrios, and carry out the same experiment, it is obvious when 1, 2, and 3 are mixed and incubated there will be no fixing of the complement, and, when 4 and 5 are added, the complement will be free to satisfy the hæmolytic amboceptor, and hæmolysis will take place.

Specific antigen	+	heated normal serum	+	complement	+	specific antibody, hæmolytic for rabbit's red cells	+	rabbit's red cells	=	hæmolysis.

The application of the test then lies in replacing the No. 2 element by the serum suspected of containing the specific antibody, and it will be at once seen from the two last tests that if the specific antibody is present no hæmolysis will take place, whereas hæmolysis will occur if there is no specific antibody present.

The first difficulty that came in the way of applying this test to cases of syphilis was the inability to grow the spirochæta pallida, and was overcome by Wassermann, who used extracts of syphilitic tissues as his antigen. The extracts are made with normal saline from the liver or spleen of an hereditary syphilitic fœtus, these organs containing the spirochæta pallida in very large numbers. To apply the test, then, the following ingredients are prepared:—

No. 1.—An extract of hereditary syphilitic fœtus, liver, or spleen.

No. 2.—The suspected serum which is heated at 56° C. for half an hour to destroy the complement. (In Wassermann's early work he demonstrated the presence of the antibody in the serum of infected monkeys, and in the cerebro-spinal fluid of cases of general paralysis of the insane.)

No. 3.—Complement is obtained from the serum of a normal guinea-pig.

No. 4.—The hæmolytic serum used is obtained by injecting the red cells of a sheep into a rabbit at intervals, and thus obtaining in the rabbit's serum a specific antibody capable of hæmolysing sheep's red cells. This serum is also heated to destroy the complement.

No. 5.—Sheep's red cells are used, washed in normal saline.

The experiment is as follows: Nos. 1, 2, and 3 are mixed and incubated at 37° C. for one hour, and then Nos. 4 and 5 added, and again incubated at 37° C. for one hour. The presence or absence of hæmolysis is noted, and may be expressed as an equation:—

$$\begin{array}{c}\text{Syphilitic}\\\text{antigen}\end{array} + \begin{array}{c}\text{serum suspected}\\\text{of containing}\\\text{syphilitic antibody}\end{array} + \begin{array}{c}\text{comple-}\\\text{ment}\end{array} + \begin{array}{c}\text{antibody, hæmo-}\\\text{lytic for sheep's}\\\text{red cells}\end{array} + \begin{array}{c}\text{sheep's}\\\text{red}\\\text{cells}\end{array} = \pm \begin{array}{c}\text{hæmo-}\\\text{lysis.}\end{array}$$

If syphilitic antibody is present, the complement is used up and there is no hæmolysis, while, if there is no antibody in the suspected serum, the complement remains free and is capable of satisfying the hæmolytic antibody and hæmolysis takes place.

This constitutes the outlines of Wassermann's serum-diagnosis of syphilis, but, unfortunately, it is not so easy of application as it appears, but requires a considerable amount of technical accuracy and skill. However, the chief points which put it completely outside the door of the clinical laboratory are the licence required for the experiments, or rather for the routine work on the rabbits and guinea-pigs, and the amount of serum necessary for the experiment.

The next step was made by Landsteiner, Porges, and Meier, and by other workers who showed that the antigen could not only be extracted from syphilitic tissues, but that it could be obtained from non-syphilitic organs, and could be extracted by alcohol, and that it was probably of a lipoidal character. The finding of this led to many modifications of the original test, and to many other side issues.

Various explanations have been put forward by Citron and others to explain the action of this lipoidal substance, but it is not necessary to go into them here.

Having now found that we can use the alcoholic extract of normal instead of syphilitic organs as our antigen, Bauer showed that normal human serum and syphilitic human serum both contained specific amboceptors hæmolytic for sheep's red cells. He, therefore, left out the serum of the rabbit treated with sheep's red cells, and used the following elements:—

No. 1.—Extract of syphilitic fœtus liver.

No. 2.—Serum for diagnosis, heated to destroy complement; this serum contains antibody hæmolytic for sheep's red cells, and also may or may not contain syphilitic antibody.

No. 3.—Guinea-pig's serum containing complement.

No. 4.—Suspension of sheep's washed red blood corpuscles

Nos. 1, 2, and 3 are mixed and incubated at 37° C. If syphilitic antibody is present, the complement becomes fixed, and no hæmolysis takes place when No. 4 is added.

If, on the other hand, there is no syphilitic antibody, the complement is not fixed but remains free to satisfy the hæmolytic antibody, and hæmolysis occurs. Bauer tested the reaction, controlling with Wassermann's procedure, and found they agreed.

The next step in simplification was described by Hecht. The serum in his method is not heated, and consequently the complement is not destroyed, and we can now dispense with the guinea-pig's serum. The test now differs very considerably from the original test as described by Wassermann, but has this advantage, that it comes within the scope of ordinary clinical work. Hecht's modification has been used by Fleming and described by him in the *Proceedings of the Royal Society of Medicine*, vol. ii., No. 8, 1909, and also in the *British Medical Journal* of October 2, 1909.

Fleming's method differs from the original in the details of technique, and in the small quantity of serum which he uses, and his results, which can be seen in the publications referred to above, have been excellent. In my application of the test, I have apparently only differed from Fleming in using the sedimentation pipette throughout instead of using small test tubes, as described by him, and I certainly think that this use of the pipette has many strong points in its favour, especially where one's supply of blood serum varies in amount, and cannot always be obtained personally. The following is a detailed description of the substances used, and also of the way in which I have carried out the test.

(1) Alcoholic extract of rabbit's heart. To prepare this: Take a rabbit's heart, wash it well in normal saline solution till there is no blood left. Then cut up as fine as possible, weigh, grind in a mortar with sand, and for every gram weight of heart add 5 cc. of 95 per cent. alcohol. Extract for two hours at 60° C., and then filter.

The clear filtrate is kept tightly corked in a test tube as a stock solution for use. For use I dilute one part of the extract with ten parts of normal saline. My first experiments went completely wrong by having too much alcohol in the extract when mixing with the serum, the result being that I got a precipitate of globulins when the two came together.

(2) The serum to be tested. For this the ordinary capsules are used to take the blood, and it is necessary to have them well

filled so as to have sufficient serum. Disappointment may occur when the blood lakes, which it does sometimes for no apparent reason, and, of course, if this occurs, the serum is quite useless. So far I have always allowed the blood to stand for twenty-four hours after being taken.

(3) A 5 per cent. suspension of sheep's red cells in normal saline. To obtain this, the blood is taken at the slaughter-house, about 10 cc. being placed in a flask containing 75 cc. of 1·5 per cent. sodium citrate in 0·85 per cent. saline. The cells are removed by a pipette, and washed three or four times with fresh quantities of the above saline. I find that these cells will only last about three days, but I am quite certain by the use of some preservative this drawback can easily be overcome.

To examine a case five tests are put up, sedimentation pipettes being used, containing the following :—

(*a*) One part suspected serum, four parts extract.
(*b*) One part suspected serum, four parts normal saline.
(*c*) One part normal serum, four parts extract.
(*d*) One part normal serum, four parts normal saline.
(*e*) Four parts extract.

The technique is quite simple; a mark is made with a glass pencil on the pipette in the usual way, and the serum drawn up to the mark, and then four parts of saline or extract as the case may be. Mix well in the upper part of the tube, then seal the end in the Bunsen flame and put in the incubator at 37° C. for one hour. Remove the series of tubes at the end of the hour, and to each add one part of 5 per cent. suspension of sheep's red cells in 0·85 saline. To do this cut off the sealed end of the pipette, blow out the mixture on to a slide, take up five parts and add one part of suspension and mix well in the upper part of the pipette, and again seal off. Here it will be found best to keep the mixture well up in the pipette, because the hæmolysis is much easier to see through a thicker column of the fluid. Place in the incubator again for one hour.

What we have now in the various tubes is as follows :—

No. 1 substance, the extract, represents the antigen. No. 2 substance in tubes *a* and *b* is the suspected serum; if syphilitic it contains syphilitic antibody as well as complement, and antibody hæmolytic for sheep's red cells. No. 3 substance in tubes *c* and *d* is normal serum, and therefore contains only complement and hæmolytic antibody. No. 4 substance is the sheep's washed red cells. Tubes *b*, *c*, *d*, and *e*, are controls for *a*, and in the case of a syphilitic serum the result may be expressed by equation as follows :—

A. Antigen	+	syphilitic antibody	+	comple-ment	+	hæmolytic antibody	+	sheep's red cells	=	no hæmo-lysis.
B. Normal saline	+	syphilitic antibody	+	comple-ment	+	hæmolytic antibody	+	sheep's red cells	=	hæmolysis.
C. Antigen	+	complement	+	hæmolytic antibody	+	sheep's red cells	=	hæmolysis.		
D. Normal saline	+	complement	+	hæmolytic antibody	+	sheep's red cells	=	hæmolysis.		
E. Antigen	+	sheep's red cells	=	no hæmolysis.						

From the above then we get in a positive syphilitic reaction no hæmolysis in tubes *a* and *e*, and hæmolysis in tubes *b*, *c*, and *d*. If the case is not syphilitic, there is hæmolysis in *a*, *b*, *c*, and *d*, and none in *e*. Where a series of cases is to be tested, it is well to use as normal serum one that has been proved not to give the syphilitic reaction, and to commence by preparing tubes *c*, *d*, and *e* which will serve, in this way, as controls for all the suspected serums. For each suspected serum then we only have to put up *a* and *b*. It is further advisable to put up a known syphilitic serum, if possible, as in this way sources of error may be eliminated, and as far as I could I have always done this in my cases.

It may occur at times that there will be no hæmolysis in either tube *a* or *b*, but this cannot cause any false reading of the result to be made, because although tube *a* may appear positive, tube *b* will at once show that there is something wrong with the serum; this may be due either to deficiency of the normal hæmolytic power of the human serum for sheep's red cells, or to a want of complement. Fleming says this happens in about 10 per cent. of cases, and Bassett-Smith, *British Medical Journal*, August 14, 1909, gives this figure at 30 per cent. of serums, but I cannot agree with either of them, as I only found it to occur three times in 141 cases, and I think that perhaps their high figures may be due to not washing the red blood corpuscles of the sheep sufficiently, it being known that the more carefully these red cells are washed the more sensitive they will become to any hæmolysing substance, or perhaps the sheep of Malta may have very sensitive corpuscles.

If it should occur, a very simple method of overcoming it is described by Fleming as follows. If it is the hæmolytic antibody that is wanting add one volume of one's own inactivated serum (heated at 56° C. for half an hour) to the tubes as they come out of the incubator after the second incubation and put them back again for another hour, and then note the result. If the complement is missing there will be no hæmolysis after the above addition, and the test will have to be done all over again, but in this case to each tube at the beginning one volume of fresh normal serum must be added, and the test carried out in the ordinary way.

Basset-Smith is inclined to think that indefinite results are got by such small quantities being used, but it is essential for a clinical test such as this that large amounts of serum should not be necessary, and I do not think if accurately carried out that the results are indefinite.

I have found that in some cases a faint trace of hæmolysis may occur in tube *a* (the tube containing the antigen and the syphilitic antibody), but it is only natural that where the antibody is disappearing from the blood that there should be various stages in the amount to be found at different times, and I may say that this has only occurred in cases that have been under treatment for some time, that is in those which have at least finished their second course.

Clinically there are two very distinct points, one that of diagnosis, the other that of treatment. From the diagnosis point of view in primary cases, Bassett-Smith in his conclusions says that the reaction may be obtained as early as fourteen days after infection, but what I think would be of much more weight would be the absence of reaction in the case of a sore in the very earliest stage followed by a positive result later. There is plenty of room here for very interesting work. In the early secondary stages, a positive result can apparently be obtained in a very high percentage of cases. In the tertiary stages congenital cases, and parasyphilitics, the results vary somewhat but are distinctly good. From the treatment point of view, whatever this syphilitic antibody may be, it apparently disappears from the serum as the patient becomes cured, and this opens up a very large field for investigation, which is well within our reach. Cases are kept under observation for a year after their final course and many can be got much later, and all these can be followed up and examined from time to time, but it certainly appears obvious that the treatment should not be stopped in anyone on the Syphilis Register till the antibody has disappeared from the serum.

Before going on to a description of the cases tested I may state that this reaction is quite easy to read, and that the reading may be taken on removal from the incubator, but that after removal the tubes ought to be allowed to stand for twenty-four hours and another reading taken then.

In nearly all my cases Lieutenant-Colonel C. Birt has very kindly taken the readings for me as an independent authority, and not knowing anything previously of the sources from which the blood came.

I have examined 141 different samples of serum, of which 54 have been from cases where no history of syphilis could be elicited, 74 from men on the Syphilis Register, and 13 from patients with a doubtful venereal sore. These last 13 cases cannot enter into any of my present calculations, as they are suspicious infections and have not had time to develop, but the results showed four to be positive and nine negative. All of them are under careful observation, and I hope shortly to re-examine some of the negative ones again.

Examining the whole 141 cases, only three showed a complete absence of hæmolysing power, this being a percentage of just over 2, as compared with Fleming's 10 per cent. and Bassett-Smith's 30 per cent. The first of these cases was a man with a malarial history, and on addition of a little guinea-pig's serum I was able to get hæmolysis, thus showing that it was complement that was wanting. I examined this man again about a fortnight later and got hæmolysis without the addition of any other serum, thus confirming the first experiment. The second case, a normal man, was very similar, but I had no spare serum to add on the day I was doing the experiment, and at a second examination, two days later, I got hæmolysis at once without any addition, thus showing that the normal hæmolytic amboceptor was present. In the last case, another malarial patient, I carried out the experiment as described in the first part of this paper. No hæmolysis having taken place in either tube on removal from the incubator, I added one volume of my own inactivated serum (heated at 56° C. for half an hour), that is, I added hæmolytic amboceptor. The tubes were again replaced in the incubator for another hour, but on removal it was again found that there was no hæmolysis.

The experiment was now started from the very beginning, but to each tube, in addition to the usual constituents, one volume of normal active serum was added, and the ordinary routine followed. The result now obtained was hæmolysis in both tubes, showing that the case gave a negative reaction to syphilis, and that it was complement which was wanting in the first experiment. All three cases then were wanting in complement, and it can easily be seen that this want of hæmolytic amboceptor or complement can in no way lead to a false reading of the results.

Passing now to the normal cases, these were fifty-four in number, and none of them gave a positive syphilitic reaction. The sources from which I obtained my non-syphilitic serum were mainly two, the Royal Army Medical Corps detachment and the

patients in hospital. The detachment was composed of normal healthy men, and I only took serum from those giving no history of venereal disease. The patients in hospital were mostly minor injuries, two cases of enteric fever, and several of tonsillitis. I was also very pleased to get three malarial cases, and to obtain negative results from them, as I had some doubts as to how malarial serum would react.

Before going on to a description of the syphilitic cases I must first, in explanation of Table II., point out what is meant by the various courses of mercury, and for this purpose I have copied the scheme printed in the final report on "The Treatment of Venereal Disease and Scabies in the Army, 1906."

1st Course. Six weeks' treatment .. 6 injections .. 0·6 grammes of mercury (9 grains).
Two months' interval.
2nd Course. Two months' treatment .. 4 injections .. 0·4 grammes of mercury (6 grains).
Four months' interval.
3rd Course. Two months' treatment .. 4 injections .. 0·4 grammes of mercury (6 grains)
Six months' interval.
4th Course. Four months' treatment .. 4 injections .. 0·4 grammes of mercury (6 grains).
Total .. 21½ months' treatment, 18 injections, 1·8 grammes (27 grains) of mercury.

Of course it is needless to remark that this scheme is varied in different cases, and by different medical officers, but it gives a good idea of the time taken and the amount of mercury given, and forms a working basis for results. After the last course of treatment, a patient is kept under observation for a year before he is finally struck off the register.

Table I. gives the total number of patients on the Syphilis Register whose serum was examined, and it will be seen that a very high percentage of positive results (80 per cent.) was obtained. These cases were not chosen in any way, but were sent to me from the various hospitals in Malta on the days on which injections were given.

Table II. gives the details of the cases as regards the various courses which they were getting at the time, and of cases undergoing or finished the first course thirty-five were examined, thirty-four positive and one negative. This one negative case was a gunner, whose history was that of sore, but no rash or sore throat. The percentage figures of the second course are for all practical purposes the same as the first. The percentage of positive results begins to come down in the third and the fourth course, and after the fourth course is 50 per cent. The last row of figures is the result of late tertiary symptoms, coming on several years after infection, and here, where active symptoms are present, the

percentage at once goes up again. This table gives a very clear idea of the effects of treatment on the presence of the syphilitic anti-body in the serum, and is clinically very interesting.

Table III. was made out to see what the percentages were under one year's treatment and over, and shows exactly what one was led to expect from Table II.

TABLE I.

Cases	Number examined	Positive result	Negative result	Percentage of positive results
Cases with syphilitic history examined	74	59	15	80 per cent.

TABLE II.

Cases	Number examined	Positive result	Negative result	Percentage of positive results
Cases either undergoing or finished 1st course	35	34	1	97 per cent.
Cases either undergoing or finished 2nd course	4	4	..	100 ,,
Cases at 3rd and 4th course	8	5	3	62 ,,
Cases finished treatment but still under observation	22	11	11	50 ,,
Cases recurring and showing late tertiary manifestation	5	5	..	100 ,,

TABLE III.

Cases	Number examined	Positive result.	Negative results	Percentage of positive results
Cases under 1 year's treatment	45	42	3	93 per cent.
Cases over 1 year's treatment	29	18	11	62 ,,

CONCLUSIONS.

(1) The diagnosis of syphilis can readily be made by means of a reaction in which rabbit's heart extract, sheep's red blood corpuscles and the suspected serum alone are employed.

(2) Eighty per cent. of cases of syphilis diagnosed clinically have given positive results.

(3) In 100 per cent. of non-syphilitic blood examinations the result has been negative.

(4) The reaction has not appeared in the blood of some of those patients who have undergone a prolonged course of mercurial treatment.

United Services Medical Society.

NOTES ON SEVEN-DAY FEVER OF THE EASTERN PORTS: ITS OCCURRENCE IN THE NAVY AND ITS RELATIONSHIP TO DENGUE.

By Fleet-Surgeon F. H. A. CLAYTON.
Royal Navy.

As probably all members of this Society are already aware, seven-day fever is a term introduced by Major Leonard Rogers, I.M.S.,[1] to denote a mild form of pyrexia prevalent in various Eastern ports, and which he believes, although recognising its general similarity to dengue, to be distinct from that disease.

It is the object of this paper to bring forward such evidence as to the causation of this fever and its relationship to dengue as may be afforded by a study of its occurrence in the Navy during the past ten years or more, and by personal experience of an outbreak observed at Bombay in 1907 and various other cases seen at odd times. Its nature seems to be a most appropriate subject for discussion by this Society, since numerous members in all three Services must have a practical acquaintance with it, and probably some share Major Rogers' views; while, although not an important or dangerous disease, it is a fruitful source of loss of service to Army, Navy, and civilian alike.

The ailment is not at present clearly recognised as occurring outside the limits of the naval East Indian station, and, in studying its occurrence in that squadron, observation is practically concentrated on Bombay, for, although it is prevalent in Calcutta and Rangoon, the visits of men-of-war to these ports are too infrequent and of too short duration to produce much influence. Nor does personal experience and study of the records indicate any great prevalence of this particular type of fever in other ports frequented by ships on the station, such as those in Ceylon and the Persian Gulf, most of the cases reported from these being either malarial or more definitely connected with high atmospheric temperature, although one or two quite definite cases of seven-day fever came under treatment in Colombo, and there is an outbreak of somewhat similar character recorded in 1899 at Aden by the "Racoon."

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[1] "Fevers in the Tropics."

Bombay, on the other hand, is the headquarters and the docking port for the squadron, is a well-recognised focus of infection, and the medical history of the ships there has for many years included outbreaks of this nature.

Probably the majority of members are well acquainted with the symptoms and characteristics of the ailment, but, in order to make this paper complete and intelligible, one must give a brief outline of the symptoms and of what is known of its causation.

Symptoms.—The onset is fairly sudden, sometimes marked by rigors or chilliness; the face is often flushed and conjunctivæ injected; the patient nearly always complains of headache and of lumbar pain, frequently of pains in the limbs or of general pains, rarely of pain referred to the joints. The pulse is characteristically slow, rarely above 100 even with high temperature; the tongue becomes furred, with red edges; the bowels are often confined and the abdomen sometimes slightly distended; the liver and spleen are hardly ever enlarged, and respiratory symptoms are, in my experience, conspicuous by their absence, although, according to Megaw,[1] bronchial catarrh forms the most frequent complication. A rash appears at some period in the illness in a varying number of cases and is usually mottled and morbilliform, appearing on the trunk and extensor surface of the forearms. Rogers[2] states that a rash appears in 7 per cent. of the cases; this is probably an underestimate, as the rash is often slightly marked and evanescent. The temperature shows a most characteristic saddleback curve, illustrated in the accompanying charts, which varies according to the depth of the remission and the time at which the patient comes under observation, but in which the curve can almost always be traced and the typical terminal rise demonstrated. This usually falls rapidly about the sixth day, and convalescence is immediate and uninterrupted by complications or sequelæ. The blood often shows a marked leucopenia, the ratio of white to red being as low as 1 to 1,000, and the total often 2,000 to 4,000 per cubic centimetre. With this there is usually a considerable reduction of polymorphonuclears with a relative increase in lymphocytes and large mononuclears, the latter being over 15 per cent. in a fifth of Rogers' cases.

No more time can be devoted to a consideration of symptoms, except to say that the diseases most likely to be mistaken for

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[1] *Indian Medical Gazette*, January, 1909.

[2] *Op. cit.*

seven-day fever are malaria, measles, influenza, and, according to Rogers, dengue. From a naval point of view malaria, and to some extent measles, constitute the chief source of difficulty, since, as will be seen later, the first almost always tends to occur coincidently. Blood examination, the character of the chart, the therapeutic effects of quinine, the presence of splenic enlargement or tenderness, the greater frequency of marked gastric disturbance, the more rapid pulse in malaria, and the rash, if present, in seven-day fever, are the signs chiefly to be relied upon for distinction.

The chief points bearing on causation which have been noted by Rogers are the frequency with which sailors or persons connected with shipping constitute the first victims; the restriction of the disease to the coast; its prevalence in hot and rainy seasons only; and the greater immunity of natives as compared with Europeans. He was struck by the resemblance of the more continued types to typhoid and paratyphoid fevers, and made numerous attempts to isolate an organism from the blood, finally succeeding in six instances, the organism being allied to the coli group.

As the climate of Bombay and the seasonal prevalence of malaria have some bearing on the question of causation, it will be convenient to give here a brief sketch of the facts in connection with these two points. Bombay may be described as fairly hot and oppressive, owing to humidity, all the year round, but from about November till April this condition of things is to some extent tempered by the presence of the north-east monsoon, which makes it much more bearable. These months are practically rainless. April, and more particularly May, before the burst of the south-west monsoon, are hot, stagnant months, usually relieved by the commencement of the rains about mid-June. October and early November, before the commencement of the north-east monsoon, are also trying.

Powell's[1] figures show that malaria occurs all the year round, and that its seasonal prevalence is not so definitely marked out as in Calcutta, due probably to the more distinct cold season in the latter; but that there is a very decided increase in all types from July to December—*i.e.*, with, and following on, the rains. Naval experience (and here one is dealing with a body of men of whom probably 90 per cent. are previously uninfected) shows much the same thing, cases occurring, especially when quartered ashore, all the year round; but the accounts of really severe outbreaks are practically confined to the period between July and October.

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[1] Rogers,*op. cit.*

To pass to seven-day fever in the Navy, the ships—for the purpose of studying its occurrence in the fleet at Bombay—may be divided into three classes.

First, there are, or were, the ships of the Indian defence flotilla, which, with the exception of going out occasionally for short exercises, lay in Bombay harbour normally the whole year round. Their crews, consisting roughly of half Europeans and half natives, were hulked in the "Tenasserim," which was moored about three-quarters of a mile from the Apollo bunder; but it was the usual custom to dock her from about June to mid-September on account of the bad weather met with in the harbour.

The chart, which has been made out for the ten years 1893 to 1903, when the flotilla was done away with, shows the incidence of the so-called simple-continued fever among her crew. It is to be feared that all the figures are not absolutely to be relied upon, as in the summer outbreaks some malarial cases were almost certainly included, and in fact some cases which continuously relapsed almost at once have been omitted as probably of that nature. No alteration has, however, been made in the part of the chart marked in black, as these are figures given by Fleet-Surgeon Bassett-Smith, who made a special study of the disease, and whose results may therefore be absolutely relied upon. It will also be shown later that there is much evidence to prove that the outbreak in March, April, and May, 1898, was mainly seven-day fever.

The first point of interest about the chart is that during the first two years, when the ship, instead of going into dock, was either anchored outside or at Karachi, there was very little fever of any sort. Nevertheless, no direct and immediate dependence on docking is demonstrated, since many outbreaks occur long after or preceding it. Secondly, it is of great interest to note how outbreaks constantly follow fairly closely on the arrival of new crews, or, in other words, new supplies of susceptible material from home. This is a marked feature of all reports from medical officers about this disease, and is well illustrated by the outbreak described by Bassett-Smith as occurring in November, 1896, only the new crew just joined from England being affected.

Another point that is brought out by the chart is that the seasonal prevalence in naval cases differs very markedly from that given by Rogers in his book with regard to Bombay. Well-authenticated outbreaks are described as occurring during the months of October, November, January, March, April, and May, and also July and August. In fact this chart and naval experience generally

would suggest that the supply of susceptible material has a good deal more to do with the matter than season.

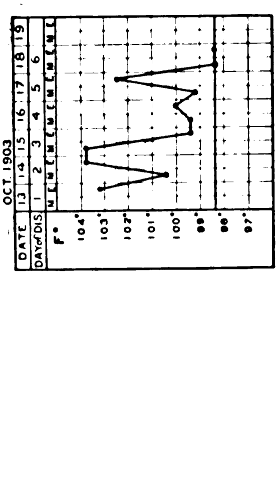
The second class of ships that must now be dealt with are the smaller ships which are largely absent from Bombay, but which return to that port to refit; for which purpose they go into dock, and their crews, as a rule, are accommodated in the sailors' home.

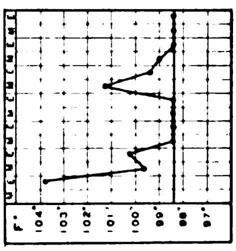
The history of these ships, which I have tabulated for the last ten years, shows that outbreaks which can be recognised as seven-day fever occur almost, if not quite, invariably during, or closely following, their stay in dock; and that simultaneously a good many cases of malaria are apt to develop, although this, unlike seven-day fever, is not so much confined to Bombay. Moreover, while not invariable, this development of such a form of illness as a result of living ashore occurs with a fair amount of frequency, although, once again, the influence of susceptibility is illustrated, such outbreaks tending particularly to occur on the first exposure after arrival from home. The chief point to be noted, however, is that they do not suffer while the ship is in the stream, but that fairly frequently when she is put into dock the illness follows. Outbreaks are less frequent in the gunboats owing to the comparatively small number of white men involved. Their occurrence is also largely dependent on the length of stay in dock.

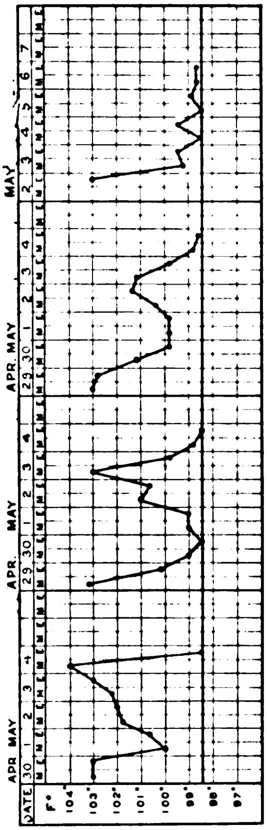
Finally, there is the third class—the big ships of the station, which usually spend a considerable portion of the year at Bombay, but which go into dock for a week at most, and spend their time in the stream. Their men frequently work in the dockyard during the day; they are allowed leave daily, and must often have come into contact at the sailors' home with ships' companies attacked by this fever. Yet, with one exception which is specially mentioned later, no evidence can be found of a typical outbreak in these ships while at Bombay comparable with those that occur in the other two classes, for, although they often returned a good many cases of simple-continued fever, these are distributed throughout the year, and, where described, do not conform to the picture of seven-day fever. A small group of cases, however, which occurred in my own ship will also be referred to again.

In the history of the occurrence of this disease in the squadron, therefore, the one outstanding feature to claim attention is the marked analogy it bears to the mode of occurrence of malaria in the Service afloat. Both rarely occur unless the men are landed for some considerable time; both are especially apt to occur when ships go into dock at Bombay; while in ships which only dock for a day

Mr. F. C. Midan, "Cressy."

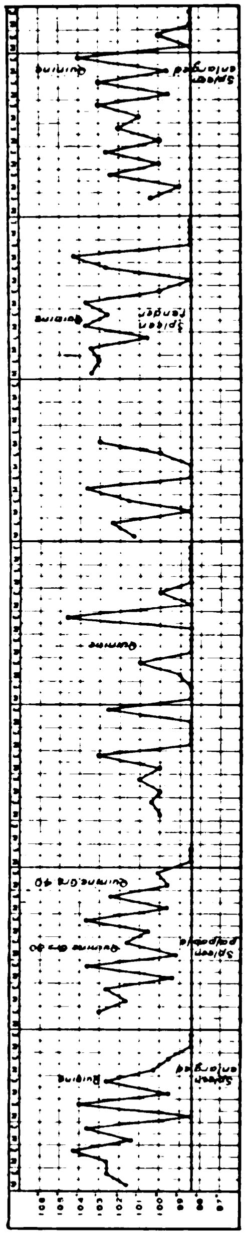






Cases in "Pigeon," April and May, 1908. S. S. Smith.

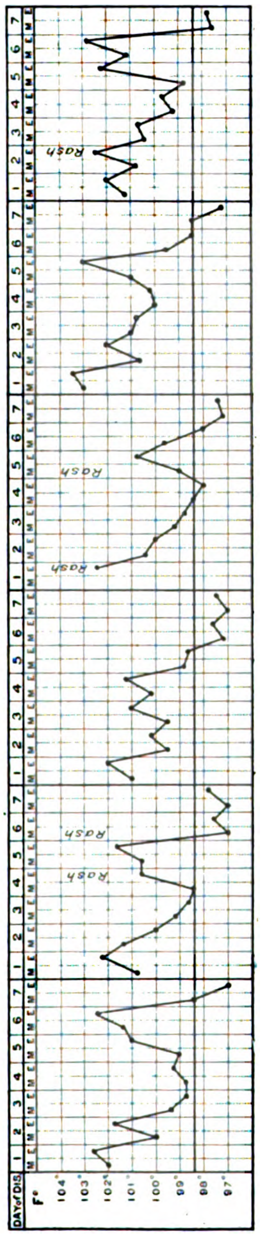
Malaria Cases in "Proserpine."



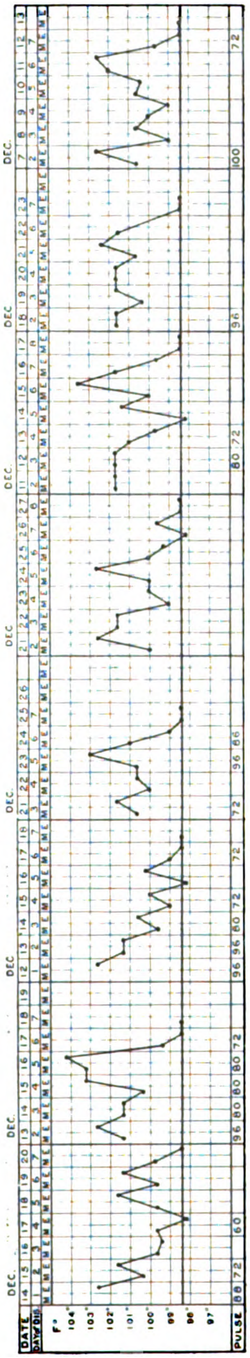
Malaria Cases Occurring Coincidently.

MAGDALA OUTBREAK, JANUARY 1897. BASSETT-SMITH.

Case 1. Case 2. Case 3. Case 4. Case 5. Case 6.



"PROSERPINE" CASES, 1907.



SEVEN-DAY FEVER CASES.

or two, there is, so far as Bombay is concerned, a comparative absence of both. Finally, they both tend to manifest themselves together. For instance, there are accounts of three outbreaks available in which careful differentiation by blood examination and other methods was carried out. In the first, as described by Bassett-Smith, numerous cases of both occurred; in the second, I found twenty-two cases of malaria and fifty-nine of seven-day fever; and Fleet-Surgeon Munday has recently sent me an account of an outbreak in the "Proserpine" this year where ten cases of malaria, verified by blood examination, occurred, and forty-eight of what was diagnosed as seven-day fever.

Where, however, the two diseases differ is that epidemic malaria is practically confined to the summer, whereas outbreaks of seven-day fever may occur at any time and appear to depend more on a supply of susceptible subjects than on season.

Nevertheless the conclusion to which these facts point is obviously that infection is conveyed by some blood-sucking fly, and the chief point against this is that the outbreaks in the hulk "Tenasserim" were not synchronous with the docking. It is singular, however, that during the two years when the ship was not docked there was very little fever of any sort. Moreover, stray mosquitoes are to be found in ships even a mile from the shore at Bombay, probably conveyed in boats, and I have more than once found them breeding on board—*e.g.*, in basins of unused cabins. In the "Tenasserim," at Bombay, all the year round and for four months in dock during the rains the chances of this must have been much greater, while old ships possessed far more facilities for the breeding of mosquitoes than a modern cruiser.

Various points about an outbreak observed by myself in 1907, and an account of which was published last year,[1] fit in with the theory of conveyance of infection by insects. This occurred among the men of the "Proserpine," 240 in number, then quartered at the sailors' home while their ship was in dock. They went there on October 29th in exceptionally good health, and the first cases appeared on November 17th, and continued to crop up till after they left on January 15th, twenty-two cases of malaria and fifty-nine of seven-day fever having been noted by the end of the year, and some twenty or thirty more later. No evidence could be obtained pointing to food infection, and the incidence upon the various classes of men suggested that sleeping at the home was responsible rather

[1] *Journal of Tropical Medicine and Hygiene*, June 15th, 1908.

than work in the dockyard. A spot map showing the men attacked in the various rooms exhibited a distinct tendency for cases to occur in small groups, men sleeping near, though not necessarily next, one another being simultaneously affected on several occasions, while the different rooms were also almost simultaneously affected and there was no definite spread from room to room. Patients were treated where they lay, yet next-door neighbours often escaped, while the men who slept in verandahs were much less attacked than those in rooms; in fact, the marines, twenty-one in number, who mingled freely with the rest during the day, but slept in a verandah facing the prevalent night-breeze, only had four men attacked, three of whom fell sick simultaneously on December 21st, long after the outbreak began, and the fourth later still.

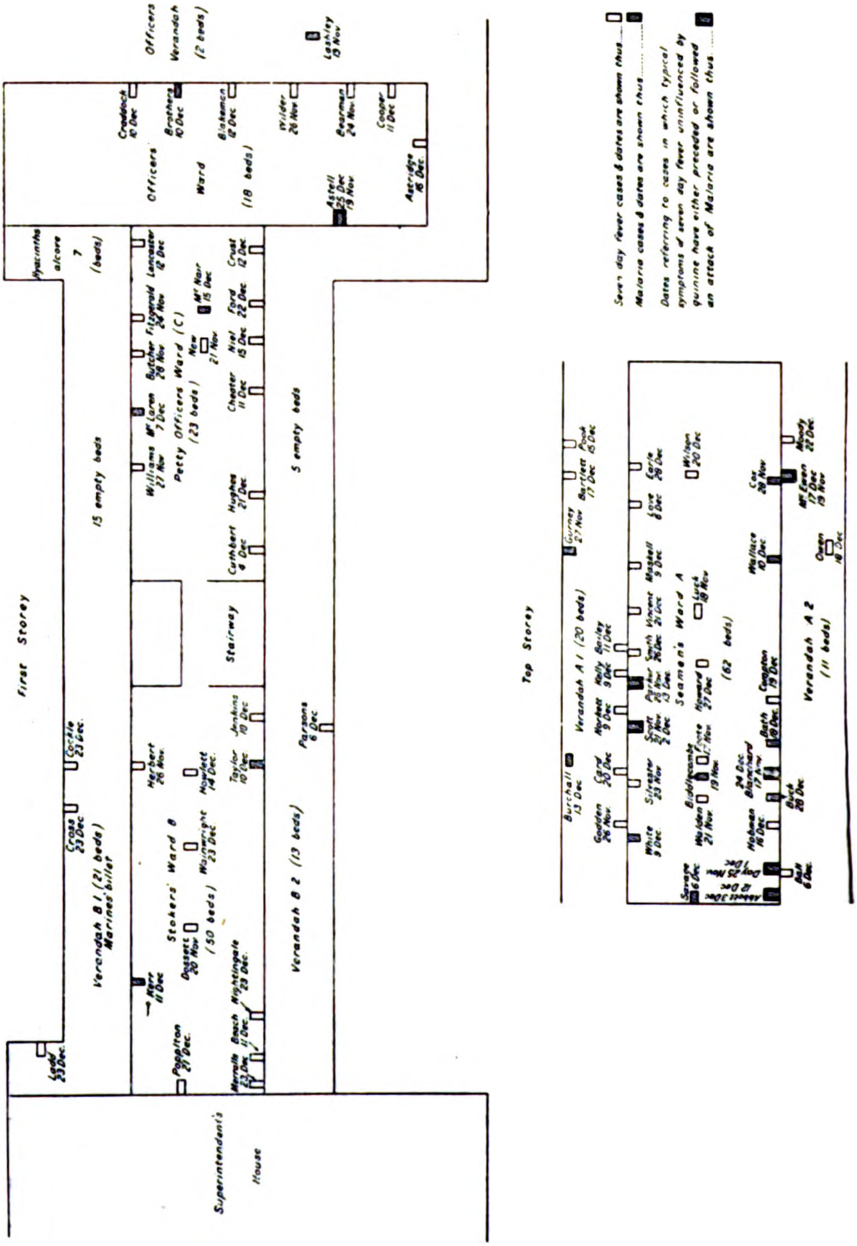
In the other ships at Bombay at the time only eleven cases occurred, all in the "Hyacinth," at the beginning of the outbreak. No attempt at isolation was made, and the men constantly frequented the home and had meals there, yet no case occurred later than December 2nd. This not only appears to argue against mere contact infection, but also in favour of the operation of some temporary factor, such as infection by insects since two of these eleven men had not been ashore.

As further evidence in favour of this method of transmission, it may be noted that after a fortnight's stay at Rangoon, in November, 1908, where the ship ("Hyacinth") lay in a narrow river and was full of mosquitoes, four typical cases came on the list. A stay of five weeks in Calcutta, however, under similar conditions as regards mosquitoes, did not produce any cases, but the temperature at Calcutta at Christmas-time is very different from anything met with at Bombay or Rangoon.

On the whole, then, the evidence to be derived from naval experience would appear to favour infection by insects, and it must be remembered that the successful mosquito experiments[1] of Ashburn and Craig in the Philippines were carried out upon cases of fever bearing a strong clinical resemblance to this particular type.

The fact that Rogers has successfully isolated an organism from the blood argues to some extent perhaps against this conclusion; but he himself is by no means certain that it bears any causal relation, it is normally found in the fæces. In the very similar fever in the Philippines the virus was found to pass through a porcelain

[1] *Philippine Journal of Science*, May, 1907.


First Storey
Top Storey
Superintendent's House
Stairway
Officers' Ward (18 beds)
Officers Verandah (2 beds)
Hyacinths alcove 7 (beds)
15 empty beds
5 empty beds
Petty Officers Ward (C) (23 beds)
Stokers' Ward B (50 beds)
Verandah B 1 (21 beds) Marines' billet
Verandah B 2 (13 beds)
Verandah A 1 (20 beds)
Seamen's Ward A (62 beds)
Verandah A 2 (11 beds)
Seven day fever cases & dates are shown thus
Malaria cases & dates are shown thus
Dates referring to cases in which typical symptoms of seven day fever uninfluenced by quinine have either preceded or followed an attack of Malaria are shown thus

filter, as in the case of Doerr's experiments in Herzegovina, and the blood picture, as stated by Rogers himself, seems much more suggestive of a protozoal than a bacterial disease.

Assuming that a suctorial insect is responsible, it seems worth while to consider for a moment whether any of the facts related with regard to the occurrence of the disease in the Navy would in any way tend to indicate the particular variety. Of course, if its action is merely mechanical, any blood-sucking insect might serve to convey the infection; but, as in Doerr's fever the parasite apparently undergoes a cycle of development in the sand-fly, a similar condition of affairs is possible in this case, although no such cycle was apparent in the successful experiments of Ashburn and Craig with *C. fatigans*.

At all events, the fact that the disease in the Navy seems so closely connected with living ashore would appear to argue against conveyance of infection by fleas, bugs, or pediculi, as there is no reason to suppose that the sailor suffers from their attacks more under such conditions than he does on board ship.

Sand-flies and mosquitoes, on the other hand, are much more troublesome ashore than afloat. With regard to the former there are, according to Mr. Howlett,[1] three distinct kinds of fly known under the name in India—namely, the Midges, the Simulidæ, and varieties of Phlebotomus, which he appears to regard as the true sand-fly. Nothing seems to incriminate the Midges, and the Simulidæ, according to Howlett, are practically confined to the hilly country; but two species of Phlebotomus are found throughout India. Their rapidity of development and also their biting propensities vary directly with temperature and moisture, and they breed in damp earth and probably, according to Austen, on the sides of latrines. On account of their seasonal prevalence, the character of their breeding-places, and their small size, they would appear less likely than mosquitoes to be present in a ship in the stream, and hence less likely to cause such outbreaks as those in the "Tenasserim," where many men attacked had not been ashore for weeks. Mosquitoes are fairly frequent enough on board ships in the stream, but I have never seen sand-flies except at Malta, where ships are practically alongside. Their habit of not usually biting in the open would, however, fit in with the comparative immunity of persons sleeping in verandahs. Evidently they must be regarded with suspicion, and the more particularly as the sand-fly has been indicated by Colonel

[1] *Transactions Bombay Medical Congress*, 1909.

Fooks, I.M.S.,[1] as the probable cause of an outbreak of a combined three-day and seven-day type of dengue at Sialkote in 1907, and by McCarrison as the cause of his three-day fever of Chitral. Doerr[2] too, has proved that Phlebotomus conveys the infection in the three-day fever of Herzegovina, and this observation has, I believe, been confirmed by officers of the Royal Army Medical Corps in the simple fever of Malta.[3] Lieutenant-Colonel Gerrard appears to regard this latter fever as allied to, if not identical with, the three- and seven-day fevers of India, a theory it would be rash to dispute in the present state of our knowledge, although it may be pointed out that the seven-day saddleback type of fever constitutes a very small minority of his cases, and occurs only in the hot weather (perhaps due to the lower temperature of Malta), and, finally, that a definite rash is practically unknown.

Turning to mosquitoes, the ubiquitous *C. fatigans* has been experimentally shown by Graham,[4] at Beirout, and by Ashburn and Craig to be capable of conveying the infection of dengue, the cases in the latter instance strongly resembling seven-day fever. As they have pointed out, too, the distribution of this mosquito agrees with that of dengue, while its prevalence all the year round at Bombay would fit in with that of seven-day fever in the Navy. Among the few mosquitoes captured in the sailors' home during the outbreak in 1907 that I was able to examine, this species predominated, but the number was too small to be worth mentioning. After this outbreak nets were supplied in the home, and hopes were entertained that this would effect a diminution. The fact that, notwithstanding this, a considerable number of cases have again occurred this year cannot be regarded as a very strong argument against this method of infection, as malaria, despite the prophylactic use of quinine and of the nets, has also recurred to much the same extent, as the following table shows :—

Year	Ship	Number of men	Date of new crew joining	In Sailors' Home	Malaria cases	Seven-day fever cases
1907	"Proserpine"	238	Sept. 14, 1906	Oct. 29 to Jan. 15 (2½ months)	22	About 70
1909	"Proserpine"	240	Sept. 14, 1908	Feb. 8 to June 3 (4 months)	10	48

[1] *Indian Medical Gazette*, February, 1908.

[2] Lieut.-Colonel Birt, JOURNAL OF THE ROYAL ARMY MEDICAL CORPS, December, 1908.

[3] JOURNAL OF THE ROYAL ARMY MEDICAL CORPS.

[4] *Journal of Tropical Medicine.*

Its Relationship to Dengue.

As long ago as 1897 Bassett-Smith, in a paper read before the Bombay Physical Society, gave a most complete and accurate description of seven-day fever and expressed the opinion that it was in reality dengue.

When Rogers first published his researches into its nature, and named it seven-day fever, Captain Megaw, I.M.S., combated his conclusions and suggested that it was the sporadic form of dengue; and the same observer has shown, in the *Indian Medical Gazette* for January, 1909, the close similarity which exists between the disease described by Rogers, the Brisbane epidemic, and the epidemic which was described as dengue by Ashburn and Craig in the Philippines. He considers them and also the Chitral fever and Fooks' epidemic to be various expressions of the infection of dengue.

It will probably be admitted that these show a very striking resemblance to one another, but Rogers[1] appears to think that the Philippine outbreak may be, like others, as he had previously pointed out, seven-day fever incorrectly confused with dengue. He also regards the question as one of purely academic interest, a view with which one finds difficulty in concurring, as by the recognition of the sporadic form of dengue a step would have been taken towards the limitation of its epidemic extension. Even admitting, however, the plausibility of his explanation as regards *different* epidemics (and that in Brisbane, for instance, where 80 per cent. of the population were attacked, is very difficult of explanation on any other hypothesis than that of dengue), characteristics of that disease quite familiar to anyone acquainted with its literature would not be any clearer—namely, the variations in the proportion of severe cases and in the relative frequency of many of the symptoms and complications which have often been noted in different localities affected by the *same* epidemic. No one will attempt to argue that the characteristics of the epidemic dengue seen in Hongkong in 1902—for instance, *i.e.*, its typical chart, more constant rash, far greater severity and frequency of complications and sequelæ—do not differ considerably from those of ordinary seven-day fever. It was long ago observed, however, that, following on an epidemic, cases continued to crop up in a place for some considerable time, and there might be a slight recurrence in the hot weather for a year or two. It is contended that such cases not rarely assume far more of the type of seven-day fever. For

[1] *Indian Medical Gazette*, January, 1909.

instance, in Hongkong in October, 1903, four cases of the sort were observed, and in fact I was one of the victims, my own case being interesting, as I had just come out of hospital, then containing dengue cases, and had been severely attacked by mosquitoes. Three cases had rashes, in my own case involving the wrists; pyrexia and general aching pains were common symptoms. The most severe case, whose chart is the only one preserved, shows a temperature having some of the characteristics of both dengue and seven-day fever.

Another instance of much the same sort is recorded by Staff-Surgeon Sutton in the "Mildura" in 1905. The ship's visit to Brisbane had been postponed owing to the severe epidemic of dengue there, but, as it was said to be dying down, she arrived on May 13th, and eight days later a series of sixteen cases began. Only in one was there a skin eruption, and there were no severe rheumatic pains or serious complications, while the only chart shown is rather of the saddleback type. Diagnosis in twelve of them was apparently confirmed in hospital ashore. Such cases appear to constitute connecting links between the two diseases and present characteristics common to both, but are open to the criticism that both may have been co-existent in these ports and that the later cases were incorrectly diagnosed.

The outbreak now to be described, however, is one where what was apparently Bombay seven-day fever assumed, as the result of transference to another locality, several unusual characteristics and approached much more nearly the typical picture of dengue. This has already been referred to as the exceptional case where a big ship suffered from an outbreak and affected the "Eclipse" in 1898. It was most carefully described by Dr. James, the present Deputy Director-General Royal Navy. The symptoms were: Sudden invasion without rigors, but ushered in sometimes by syncope, sometimes by vomiting, and in several instances by colic. Frontal headache, pains in the eyeballs, and nearly always conjunctival injection were present. There was pain in the back in about half the cases. In fifty-nine out of the total 104 cases there was an initial rash, an erythematous flush on the face, chest, arms, and hands in fifty-seven, and a measly rash in two, which nearly always appeared on the second day and was evanescent. Comparatively few cases had a definite rash accompanying the relapses on the fourth day; in only one was there a mottled rash on the fingers and toes, and in only two the peculiar pain in the fingers. Critical perspirations were not observed specially, but in at least seventy there was a relapse

on the fourth day, often slight and only detected by the thermometer. Anæmia and prostration quite out of proportion to the pyrexia were observed in all cases, and in many prolonged treatment was required. Buboes followed in three cases, parotitis in one, functional heart disease with bruits in four, pleurisy in two cases, and bronchial catarrh in many; but a post-febrile rheumatic stage was not observed. Persistent pain in the back and pain in the muscles of the eyeballs, however, were present. Six cases suffered from a relapse. There is only one chart recorded, but Dr. James tells me it is fairly typical, and it will be seen to be one of the dengue type. At all events, it will probably be admitted that, taking into consideration the clinical picture generally, the diagnosis of dengue made by Dr. James was pretty well justified, and it is therefore interesting to examine further into the history of the outbreak.

The ship left Karachi, where she had been for a week alongside the wharf and therefore probably invaded by mosquitoes, on March 3rd, and arrived at Bombay two days later, when the first two cases of illness (apparently contracted at Karachi) came on the list together. No further case occurred till March 15th, ten days later, and this may have been contracted at Bombay, a fact that was unquestionable in the fourth and fifth cases, which came on the 18th and 29th respectively, as they joined the ship from the hulk "Tenasserim," already suffering from the disease. Four cases came on April 1st, the ship having left for Trincomalee on March 29th, where she arrived on April 3rd, and during this month and May (exceptionally trying months there) there was a constant succession of cases. Dr. James considered that the fourth and fifth cases undoubtedly introduced fresh infection into the ship, and in view of the dates this would seem at least probable.

From the chart already handed round it will be seen that a severe outbreak of fever commenced in the "Tenasserim" in March, and continued through April and May. Fleet-Surgeon Page says that the cases were characterised by rapid onset, fever, pains, and that the average duration was eight days. With the exception of about thirty men, it attacked the whole of the crew recently joined from England, and many cases had a measly eruption which in some cases was followed by slight desquamation. It was frequently followed by anæmia and debility. Dr. Page states that Fleet-Surgeon Bassett-Smith, then in the "Cossack," saw some of the cases and informed him that he had seen two similar outbreaks. No charts are recorded, but, fortunately, further corroboration is

provided by Staff-Surgeon Smith of the "Pigeon," who furnishes four charts of a type of fever among the crew of his ship then hulked in the "Plassy," and says that a large number of similar cases occurred on board the "Tenasserim" at the same time—April, 1898. All Dr. Smith's cases involved recent arrivals; the temperature fell to normal about the seventh day after a terminal rise which was sometimes absent; there was no rash, the severity of the symptoms varied, and quinine had no effect. The charts will be seen to be typically saddleback.

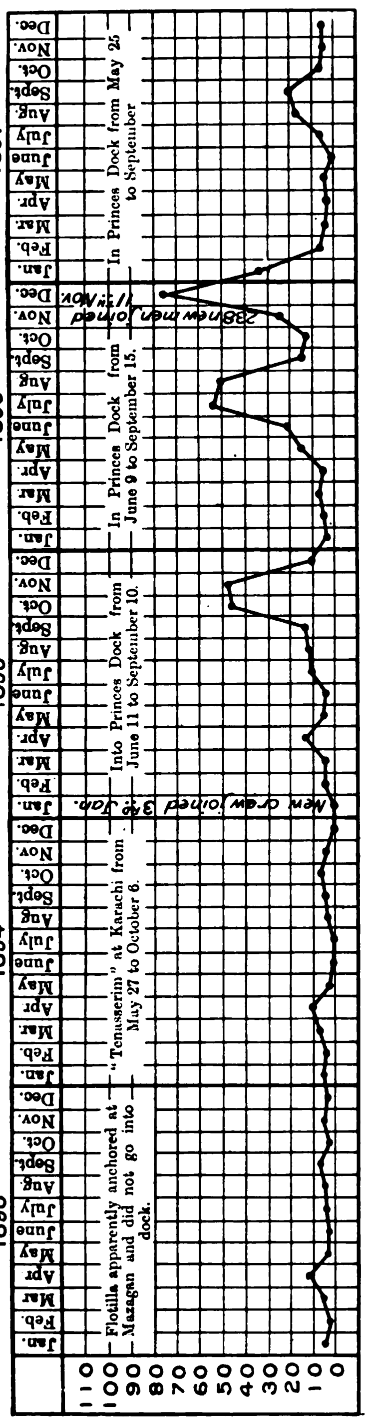
It would seem, therefore, that an epidemic which originally arose in the "Tenasserim," where typical seven-day fever was prevalent, assumed, as the result of change of locality, a form closely resembling dengue, and accordingly this evidence strongly suggests the identity of the two. Another fact suggesting this to some extent is the immunity from epidemic dengue which Bombay has apparently enjoyed since 1873, although Port Said has several times been affected, and Aden was also attacked by an epidemic in 1899.

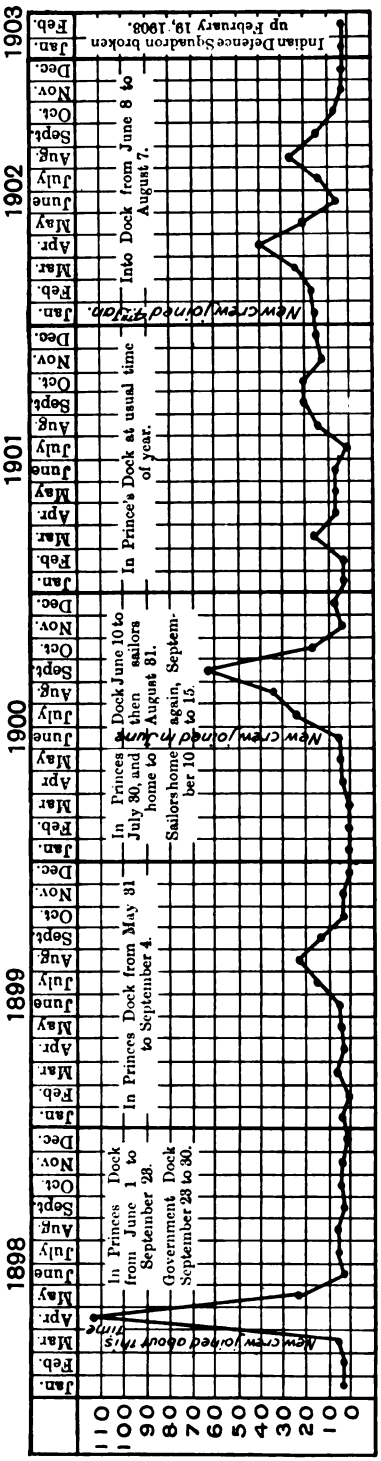
If, however, the seven-day fever is in reality the sporadic form of dengue, it is evident that certain at present unrecognized factors are necessary to convert it into the epidemic variety, and the history of this outbreak would suggest that one of these may be change of locality and climate, this view being to some extent supported by the not-infrequent change of the clinical picture noted in different places during the same dengue epidemic.

Another possible factor is, however, suggested by certain facts observed. The natives in the crew of the "Eclipse," who may be assumed, since they come from Bombay, to possess some degree of immunity to seven-day fever, were only attacked late in the epidemic, and then several suffered. This is no isolated instance, for Bassett-Smith noted in connection with his outbreak in October, 1905, that the natives suffered most during the latter part of the epidemic, and the same seems to have occurred in April, 1898.

Facts of this sort suggest as a possible explanation that there is an exaltation of virulence by passage through a series of susceptible subjects, and that the corresponding attenuation at the end of a big epidemic may result, not only from that well-recognized factor, a fall in atmospheric temperature, but also to some extent from the using up of the susceptible subjects and passage through the more resistant or comparatively immune members of the community.

In addition, therefore, to introduction into a susceptible com-


1893
1894
1895
1896
1897
Flotilla apparently anchored at Mazagan and did not go into dock.
"Tenasserim" at Karachi from May 27 to October 6.
Into Princes Dock from June 11 to September 10.
New crew joined 3rd Jan.
In Princes Dock from June 9 to September 15.
238 new men joined 11th Nov.
In Princes Dock from May 25 to September
110 100 90 80 70 60 50 40 30 20 10 0


1898
1899
1900
1901
1902
1903
In Princes Dock from June 1 to September 28.
Government Dock September 23 to 30.
New crew joined about this time
In Princes Dock from May 31 to September 4.
In Princes Dock June 10 to July 30, and then sailors home to August 31.
Sailors home again, September 10 to 15.
New crew joined in June
In Prince's Dock at usual time of year.
New crew joined 4th Jan.
Into Dock from June 8 to August 7.
Indian Defence Squadron broken up February 19, 1903.
110 100 90 80 70 60 50 40 30 20 10 0

munity, which without doubt has an important influence, an actual increase in virulence perhaps results, a theory in accordance not only with laboratory experiments, but also with the history of epidemic malaria, syphilis, and other diseases. It cannot, however, be said that much difference has been noted in Bombay in the direction of increase in severity during epidemics, except, perhaps, during the very big outbreak in April, 1898; but it is curious that in the latter part of 1896 Bassett-Smith noted that a rash was far more frequently present than among his earlier patients, so much so that he thought it possible that a fresh source of infection might have been tapped at Port Said, where dengue was then prevalent and where these men had just landed. But in the "Proserpine" outbreak in 1907, where no such explanation was available, rashes were not prevalent at one particular period, and they would also seem to have been unusually frequent and marked in April, 1898, so that apparently some alteration of type may occur.

To conclude, it is contended :—

(1) That, on the whole, naval experience of this ailment in Bombay suggests that seven-day fever is conveyed by some biting insect, and that a mosquito, perhaps *C. fatigans*, seems the most probable agent for its diffusion.

(2) That seven-day fever is in reality a sporadic form of dengue, and that its epidemic extension is promoted by certain unknown factors, such as high temperature and moisture, introduction into a susceptible community and exaltation of virulence thereby; change of locality and climate possibly play a part and cause a change in the clinical picture.

DISCUSSION.

Lieutenant-Colonel Sir WILLIAM LEISHMAN commented on some of the observations recorded by Fleet-Surgeon Clayton, but was of opinion that he had made out a strong case in support of his contention that this seven-day fever might prove to be an atypical and endemic form of dengue. At the same time, Colonel Leishman deprecated this addition to the number of diseases which were now labelled in accordance with the duration of the pyrexia in days, pointing out the unscientific and confusing nature of such a terminology; for instance, he had noticed in some of the charts of this fever which had been passed round that the duration of the fever was either shorter or longer than seven days. Such variations were well known in the case of somewhat similar diseases, and indeed, were only what one would expect to occur. At the same time,

he quite recognised that Fleet-Surgeon Clayton realised that it would be premature definitely to class this fever as dengue at the present moment. He asked whether there had been any opportunity for carrying out inoculation experiments with filtered or unfiltered blood on the lines of Doerr's work on Pappatacci fever.

Deputy-Inspector-General O'Grady said: The author of the paper states that "seven-day fever" is probably a sporadic form of dengue, and as an illustration of the conveyance of dengue from person to person, I may state that some years ago one of H.M. ships arrived at Bermuda with some cases on board, and from this infection focus the disease was spread broadcast throughout the Islands.

Major S. L. Cummins, R.A.M.C., asked whether the possibility of a bacterial origin of some of the cases of "seven-day fever" had been excluded by "Widal's reaction" for the typhoid and paratyphoid groups of organisms; and, if so, at what stage of the attack the test had been applied? He pointed out that, supposing the attack to be actually produced by one of the above organisms, a negative "Widal," *during the attack*, would have but little diagnostic significance, since the reaction is usually negative in typhoid and paratyphoid fevers until after the seventh day; and suggested that, when investigating "seven-day fever," the proper time to apply Widal's test would be during convalescence. Since Rogers actually isolated bacteria from the blood, in a limited number of cases, there would appear to be some ground for a more thorough investigation of short fevers in the Tropics from this point of view. Clinical observation of short fevers occurring in native soldiers of the Egyptian Army had led him to think a bacterial origin might be probable in some cases of "seven-day fever."

Major W. S. Harrison said that he felt some diffidence in making any comment on the paper, as he had never seen the fever described by the author. The description corresponded very closely to that given by Rogers, but he was inclined to think, with Rogers, that its identity with dengue was doubtful. The extraordinary suddenness of the onset and the violence of the preliminary pain, which were so marked a feature of the classical dengue, seemed to have been absent from the author's cases; at any rate, they did not appear to have made that impression which these symptoms made in cases of epidemic dengue. One remembered that when influenza first appeared in England it was suggested by some people that it might be dengue on account of these symptoms and on account of the extremely rapid spread of the epidemic. Indeed, dengue appeared to be a regular "King Charles' head" when it came to the discussion of epidemic fevers of short duration. On the other hand, it was possible that these sporadic cases were dengue, and that the classical picture was only produced when the virus was passed rapidly from patient to patient in considerable doses, as might happen when the fly-carrier was in great abundance. He would like to know whether Fleet-Surgeon Clayton had observed the preliminary

and secondary rashes of dengue in his cases, and whether they had shown any desquamation.

Staff-Surgeon Bond, R.N., said: "Having served in the Indian Naval Defence ships stationed at Bombay from 1901 to 1903, I have watched many cases of this type of fever, but do not remember ever having observed a case accompanied by a rash such as is seen in dengue fever. Also the type of pyrexia in this seven-day fever does not resemble that seen in dengue, in that there is no fall of temperature with subsidence of symptoms followed by a sharp rise and increase of symptoms, which is noted in Dengue fever.

Fleet-Surgeon Keogh asked if there were any records of cases of seven-day fever occurring in the Far Eastern Ports—*e.g.*, Hongkong. In Hongkong there were severe epidemics of dengue in 1901 and 1902. If seven-day fever were a sporadic form of dengue, one would naturally expect to find many cases of it in Hongkong. Did such occur?

He further asked if cases of seven-day fever exhibited the intense pains in joints and bones which were such a marked characteristic of dengue, and persisted for weeks after the febrile period. In their absence, could seven-day fever be considered to be closely related to dengue?

Fleet-Surgeon Clayton, in reply, said: It is not suggested that these cases altogether correspond to the type seen during epidemic periods, but it is contended that they constitute the sporadic form of the disease, and that the epidemic form results from the operation of several factors (some of which have been mentioned), but which are not at present distinctly recognised. As regards rashes, a secondary rash which varies considerably in intensity and also in time of appearance was observed in about 30 per cent. of my own cases, and desquamation was noted in several cases in the "Magdala" in 1898, but is decidedly not common. A primary flush also occurs occasionally. The frequent occurrence of outbreaks of considerable magnitude among Naval men, without any great alteration in duration or in the clinical features, argues, in my opinion, against any relationship to the typhoid or paratyphoid group of organisms, but I do not know of any observations which have been carried out on the Widal reaction in these cases.

It is unquestionable that the pains are rarely of the intense break-bone type met with in epidemic dengue and, they never, in my experience, persist into convalescence. It must, however, be remembered that this variation in severity and frequency of symptoms has long been noted in the true epidemic form, and that even in the Brisbane outbreak, when 80 per cent. of the population are said to have suffered, and which can hardly have been any other disease, pains are stated to have been observed in comparatively few cases.

Clinical and other Notes.

LUXUS CONSUMPTION OF PROTEIDS AND ENTERIC INCIDENCE.

By Lieutenant-Colonel G. S. THOMSON.
Indian Medical Service; 114th Mahrattas, Poona.

The paper by Captain Ainsworth, in the May number of The Journal of the Royal Army Medical Corps (1909), on the prevalence of house-flies, and their isochronism with enteric, suggested to the writer an enquiry regarding the proteid foodstuffs consumed at Poona and Kirkee and enteric incidence at those stations.

The facts at our disposal have been obtained from the manager of the "Royal Army Temperance Association," at the Connaught Institute, and from contractors to coffee-bars and regimental institutes in Poona and Kirkee, and other wholly unbiassed sources. The official figures for the average monthly strengths have been furnished by the Station Staff Officer, and are therefore correct.

The figures for Kirkee have been calculated from the average monthly cost of the various articles supplied, whereas the actual weights of proteid foodstuffs were available for Poona. It may be assumed that all men equally partook of their rations, which have been officially declared to require "but few additions." The figures show the average monthly additions which the British soldier makes in the institutes under regimental control, as it is impossible to procure returns of the &c., he consumes elsewhere, in the bazaars, cold drink shops, and private refreshment rooms.

Captain Ainsworth has made out a good *prima-facie* case for the possible relation of house-flies antecedent to the greatest incidence of enteric and its seasonal prevalence in Poona and Kirkee.

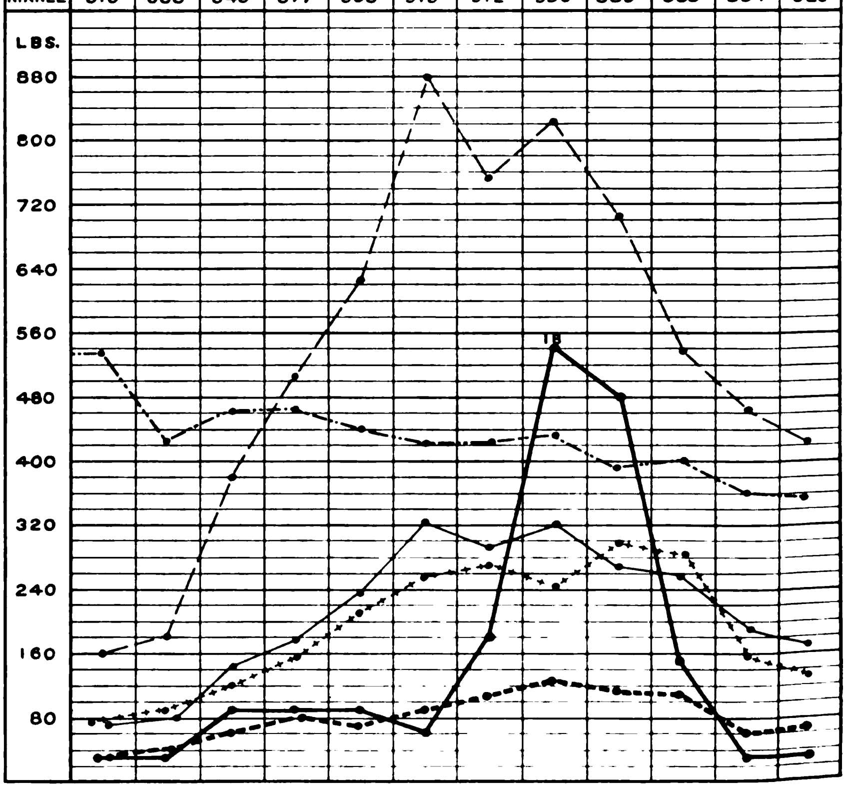
A review of the facts and figures available, however, proves a much closer relation between luxus consumption of proteids and enteric. No one can be more conscious of the risk of weakening a good cause by overstating it than the writer, yet it is certain that the opinion herein maintained will soon become the verdict of the whole medical world.

The theory has stood the brunt of every attack unscathed; and some still biased by an ignorance that mistakes itself for knowledge, may now oppose it; but to any reflecting understanding it is quite inconceivable how the relative incidence of enteric can be explained on any other grounds. Of course, it is forcing the theory to breaking point to submit it to such a severe and exceptional strain, by testing it against the

ascertained facts of the incidence of the disease, *as if no other factors were operative or equipotent* in this category. That the theory emerges in triumph out of such a scrutiny proves its supreme worth. It is in full accordance with the general drift of evidence from other standpoints, and is daily acquiring the volume and majesty of an ocean tide. Everyone is aware of the tendency in advancing years to stereotype one's opinions. Jonathan Edwards said truly: "Old men have seldom any advantage of new discoveries, because they are beside a way of thinking they have been

RELATION OF ENTERIC AVERAGE MONTHLY ADMISSIONS (1894-1908) AND LUXUS CONSUMPTION OF PROTEIDS AT POONA AND KIRKEE.

MONTH	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEP.	OCT.	NOV.	DEC.
POONA	1678	1727	1611	1577	1573	1583	1538	1512	1546	1546	1341	1386
KIRKEE	919	688	849	877	903	919	912	956	883	883	864	920



—·—·—·—·— Money Value of Proteids at Kirkee monthly in 100's of Rupees.
▬ ▬ ▬ ▬ ▬ = Bread and Rolls, at Poona only.
+ + + + + + = Milk, Butter and Eggs, at Poona only.
— — — — — = Beef and Mutton, at Poona only.
———— Average of Proteids, at Poona only.
━━━━ Enteric cases:—3 small divisions = 1 case in both Poona and Kirkee.

long used to. Resolved, therefore, that I will be impartial to hear the reasons of all pretended discoveries and receive them, if rational, how long soever I have been used to another way of thinking." Only such an impartial consideration is herein appealed to.

For enteric fever to prevail, as, indeed, for every infection, there are four essential factors necessary:—

(1) Individuals who are susceptible.
(2) The presence of the specific germ.
(3) A suitable environment for the germ.
(4) A date of delivery of the specific germ.

All these factors are equally important, and none of them can be ignored or unduly exaggerated to neglect of the others. They are all inter-related and mutually dependent in order to produce their greatest common factor—disease.

The incidence of enteric under (1) includes the consideration of age, sex, habits, race, previous attacks, immunity, either natural or acquired, and under the latter, active or passive, diet, condition of body, &c., &c.

Under (2) are involved questions of number, virulence, viability, site of absorption, products, mixed infection, malignancy, &c., &c.

Under (3) must be taken into account: Climate, fauna, flora, insanitation, geology, meteorology, social status, evolution, education, light, heat, air, food, habits.

Under (4) come: Efficient exposure to the specific germ, or the efficient access of the germ upon the susceptible individuals, living in a suitable environment.

Thorough enquiry proves for enteric fever that in the first category chiefly young men of short service and lately exposed to an alien environment become victims; and in the second, that the presence of the specific germs and their products are generally demonstrable at some stage of the disease. Under the third category we usually find effective access by contact, fingers, food, fæces, flies, shell-fish, fomites (dust and soil pollution, bedding, &c.), water, and luxus consumption of proteids. This means excess for the physiological needs *of the individual* economy, and necessarily varies for each person; and also for any given person at different periods in his evolution. Peyer's patches cannot be attacked, as a rule, after 45 years of age, as they have generally atrophied by that time of life; but there are exceptions.

Now it is just this internal irritation from excess that enables the *Bacillus typhosus* to gain a foothold. We ignorantly, perhaps, make our intestinal tract a fertile soil for this hothouse exotic—hence its undue prevalence among young officers, and in Cavalry and Royal Horse Artillery more than other branches of the service; in Infantry more than Royal Garrison Artillery; in men more than women, and in women than children. Why in children at all? They don't eat beef! Every time

almost the babe cries the ignorant mother *feeds it*—feeds it on a fluid rich in proteids, therefore some babes sometimes fall ill of enteric. The Ghurkas, in India, suffer six times as much as any other caste; they are meat eaters, so are Punjaubis, and strangest fact of all, as regards India, enteric fever only appears in jails which contain meat-eating prisoners in a meat-eating community in Madras Presidency.

The writer recognises other factors, therefore, fully; and it depends on our views of how best to diminish enteric whether we inoculate to increase the individual's resistance; disinfect to attempt the destruction of the specific germs; isolate, segregate, and quarantine, &c., to prevent its effective access; or by sanitation, &c. minimise its growth; or resort to scientific reform in our dietary, especially in the young who are suddenly exposed to an alien environment in India and elsewhere, and so preserve the health of our troops from the ravages of this pest of Western civilization. The moral was contained in Mr. J. M. Barrie's "Little Mary," ably expounded by the little lady who said, when reproached for concealing her Irish birth: "It's sinful to boast."

REPORT ON AN OUTBREAK OF MULTIPLE PERIPHERAL NEURITIS.

By Lieutenant-Colonel H. S. McGILL.
Royal Army Medical Corps.

During September and October, 1907, a number of cases presenting symptoms of peripheral neuritis were admitted from a British Infantry Regiment stationed at Poona. The regiment was a fine body of men who had arrived in the station early in the year. Previous to these cases, ten with somewhat similar symptoms had been treated between March and August. The disease occurred in an epidemic form in September, causing 21 admissions—17 in the first two weeks—continued during October, when there were 20 cases, rapidly declining in November and December to 7 and 3 cases respectively, and ceasing entirely at the end of the year. Altogether there were 61 admissions which came from every company, but three furnished one-half of the cases. The disease was not limited to any particular age: 15 occurring in men of 20 to 25 years; 29 in those between 25 to 30 years; 13 amongst men of 30 to 35; and 4 in others over that age. None of them were married, and there were no cases amongst the women.

Symptoms.—Many stated that they first noticed the symptoms, swelling and pain in the legs, with shortness of breath, on the morning of reporting sick; others that they had suffered from them for a few days, with inability to walk any distance in comfort; whilst some admitted they had noticed the symptoms for several weeks, but did not think them serious enough to report sick.

The cases can be divided into four groups, according to the severity of the symptoms: First group, 12 cases, with only the following symptoms: tachycardia, slight dyspnœa, shin œdema and weakness of the legs. Second group, 23 cases having similar symptoms, with also tenderness of the calves. In addition 3 had slight numbness of fingers and legs, 6 slight foot drop, 10 soft mitral or pulmonary bruits, 2 Romberg's symptom, several disordered gait, 16 loss of knee-jerk, and some others profuse sweating of hands and feet. Third group, 8 cases exhibited the following symptoms: tachycardia, dyspnœa, tremor of tongue and fingers, profuse sweating of hands and feet, weakness of legs, swelling and pain in calves, suffused face, restlessness, insomnia, occasional gastric irritation, loss of knee-jerk and shuffling gait. One had Romberg's symptom, and another nystagmus or lateral movement of the head. Fourth group: 18 cases formed this group, all showing the following symptoms: tachycardia, dyspnœa, shin œdema, swelling and pain in the calves and weakness of the legs. In addition, 15 had loss of knee-jerks, 10 soft mitral or pulmonary systolic murmurs, 6 marked pulsation of the cervical vessels, 6 slight foot drop, 7 numbness of calves, 1 cramp in the legs, 3 Romberg's symptom, and 1 anasarca of the extremities, abdomen and face. The gait was disordered in all, shuffling, waddling, unsteady, and in a few slightly high stepping. In none of the cases examined was the urine found to contain albumin. Out of the total number, 1 died and 2 were invalided; the remainder, 6 of whom suffered from relapses, recovered and returned to duty. The fatal case occurred during September in a man who had been nine days in hospital with tachycardia, slight dyspnœa, shin œdema, pain in the calves and weakness of legs, and who suddenly developed all the symptoms of acute cardiac insufficiency, *i.e.*, intense orthopnœa, great restlessness, profuse sweating, marked pulsation of cervical vessels, tumultuous action of the heart, and weak, very rapid, uncountable pulse—and died two hours later. The following conditions were found at the autopsy:—

Pericardium full of clear fluid; heart, weight 20 ounces, left ventricle hypertrophied, right dilated, valves healthy, but mitral and tricuspid orifices dilated. Lungs much congested and œdematous, especially at the bases. Liver weight 52 ounces, was much congested and fatty. Spleen weighed 7 ounces. Kidneys each weighed 5½ ounces, both were apparently normal. The stomach and duodenum looked healthy, showing no congestion or ulceration.

It is quite evident that we are here dealing with a series of cases exhibiting in varying degrees of severity the symptoms of multiple peripheral neuritis caused by some toxin, with a peculiar affinity for attacking the peripheral and vagus nerves. The toxins most likely to be implicated in the production of this pathological condition are those connected with: (*a*) chronic arsenical poisoning; (*b*) chronic alcoholic poisoning, and (*c*) endemic neuritis or beri-beri. (*a*) Arsenic: this can

be rejected as a possible cause, for none of the cases presented the characteristic ocular, gastric or cutaneous symptoms seen in chronic poisoning by that metal, nor was there drunk by the men of the regiment any sample of the beer, which would be the most likely vehicle for the introduction of arsenic into the system, found to contain, after most careful and independent analysis, more than the legal permissible minimum of $\frac{1}{100}$ grain of arsenic to the gallon. (*b*) Alcohol: the following facts show that alcohol taken in excess was an important factor in the causation of these cases:—

(1) *The History.*—With few exceptions all the men admitted drank beer immoderately. None of them were teetotalers, and though some stated they only drank 2 to 3 pints a day, the greater number, certainly 50, confessed to having regularly drunk 6 to 8 pints daily, not a few of them admitting to as much as 2 gallons, whilst several drank 3 gallons whenever they could get it. The larger amounts seem enormous, but the men always adhered to their original statements. Now, what does the consumption of this amount of beer represent *qua* absolute alcohol? Careful analysis conducted by the Divisional Sanitary Officer and the Director Central Excise Laboratory, Kasauli, showed that all the samples of beer drunk by this regiment contained 5·6 to 5·7 vol. per cent. of absolute alcohol, so that a man who drank from 6 pints to 2 gallons of it consumed 6·7 to 17·0 ounces of 100 per cent. alcohol, whilst the 3-gallon men took nearly 26·5 ounces. In the opinion of the director of the Central Excise Laboratory "the consumption of such large amounts of alcohol daily would suffice to account for all the symptoms described."

(2) *The Symptoms.*—Anyone who has seen a case of multiple alcoholic neuritis, which is not very uncommon in the army, would at once recognise the similarity of many of its symptoms with those I have described in this series of cases. Bain, in his "Text-book of Medical Practice," gives a clinical picture of a case of a multiple alcoholic neuritis, in which he describes the occurrence of the following characteristic symptoms:—

Formication or numbness in fingers and feet, pain in legs increased on movement, tenderness of the calves on pressure; foot drop, tremor of tongue and fingers, high stepping or waddling gait, tachycardia, dyspnœa and œdema along the shins, loss of knee-jerk, profuse sweating of hands and feet, anæsthesia of lower extremities rarely spreading to the trunk. Further, when speaking of the prognosis of these cases he remarks: "Alcoholic cases usually recover completely, although it may take months or years for them to do so. There is, however, a constant danger of sudden death in severe cases, an event that has been attributed to neuritis of the vagus leading to cardiac failure." In support of this statement, I have notes of two cases from different corps that were carried into the station hospital with all the symptoms of acute cardiac insufficiency. Both died a few hours after admission. In each the pericardium contained

some fluid. The heart was enlarged, weight 16 ounces, right ventricle much dilated, left hypertrophied, valves healthy but mitral and tricuspid orifices dilated, tissue fatty and very flabby. Lungs much congested and œdematous, liver fatty and enlarged, weight 72 and 76 ounces respectively. Spleen weighed 8 ounces, very dark coloured and soft. Kidneys weighed 7½ and 7 ounces, very fatty and congested. Stomach and duodenum congested but not ulcerated. Both these men were habitual heavy drinkers. One was of most active habits, the other never took any exercise. Neither had ever reported sick, and no evidence could be obtained of their ever having complained of feeling unwell before being carried to hospital. Osler also draws attention to a group of cases of dilatation and hypertrophy of the heart occurring in men who do very hard work and at the same time drink alcohol—chiefly beer—to excess. They report sick complaining of palpitation, shortness of breath, slight anasarca of lower extremities, pains in the legs, and later may develop symptoms of cardiac insufficiency. I may mention that almost all the men who suffered from this neuritis were of most active habits, regularly taking part in hockey, football, cross country races and gymnastics. I think it will be allowed that the evidence brought forward of the intemperate habits of a large majority of the sufferers gives colour to the suggestion that alcohol taken in excess had a good deal to answer for in the causation of this outbreak of multiple peripheral neuritis. There is, however, one feature of the outbreak that cannot be reconciled with the theory that it was entirely due to alcohol. I refer to the epidemic character it assumed during September and October. Closely as the cases described resemble alcoholic multiple neuritis, I have never known nor heard of that disease appearing in an epidemic form. So it is evident that some other toxin was primarily or secondarily responsible for this outbreak. The most likely one in the East is the unknown toxin responsible for the occurrence of endemic neuritis or beri-beri. (*c*) Beri-beri. There is no doubt that the symptoms described also resemble those attributed to the toxin or germ of beri-beri, but if the outbreak were that disease it was in most cases of the larval type. Some had more severe symptoms; one, the fatal case, was pernicious, whilst others in group "No. 4," with pulsation of cervical vessels, tachycardia, bruits, dyspnœa and general discomfort, were allied to that type. None belonged to the "dry or paralytic" form with marked paresis and muscular wasting, nor excepting one did any show the symptoms of the "wet or dropsical" type with general anasarca. According to Daniels this disease at the present day not infrequently occurs in the larval form, though there is always the danger that the case may suddenly develop acute cardiac symptoms. Assuming we are dealing with beri-beri, where did its germ or toxin come from and how did it enter the body? The modern views of the causation of beri-beri are the following: (1) The food theory: in this, certain kinds of food are believed to produce the disease owing to their being deficient in nitrogen or fat, which causes nitrogen or fat

starvation; (*b*) or to the presence of a toxin or germ elaborated in decayed or imperfectly cured fish and rice. The want of nitrogen or fat is not now credited with causing this disease, though for a long time the Japanese and others believed in nitrogen starvation. Fish decayed or badly cured need not be considered. Certain kinds of rice are believed to contain injurious qualities which when taken into the alimentary canal produce neuritis. Braddon and Fletcher, who have both had a large experience of the disease in the Malay States, are convinced and bring considerable evidence in support of their opinion that eating rice regularly and in large quantities which has only been dried before husking, stale uncured white rice, will invariably sooner or later cause beri-beri in its consumers. This does not occur if the rice after drying is boiled or steamed, then husked and dried, *i.e.*, cured brown rice. According to these authorities the husk of the dried white stale rice contains a fungus which penetrates the grain when it is decorticated and gives rise to the disease when the rice is eaten.

(2) *The Germ Theory.*—There are two views as to the path by which the infecting germ may gain admission to the body. Manson believes it to be a saprophyte that lives in the soil or surroundings of beri-beri localities—earth or place infection—and in the presence of heat, moisture, and a special soil, elaborates a toxin which being inhaled or swallowed by man causes neuritis. Wright also looks on it as a place infection, but attributes it to pollution by the fæces of beri-beri cases; the germ residing in the earth or surroundings is taken in with soiled food, and after a short incubation in the alimentary canal causes a specific duodenitis followed by neuritis.

(3) *The Parasitic Theory.*—Hewlett suggests that beri-beri may be caused by a protozoon which he reports having isolated from the urine of a beri-beri patient. Manson and Daniels also offer the opinion that pediculi may act as carriers of infection, which presupposes an infecting protozoon. Whatever influence these accepted causes may have in certain outbreaks of beri-beri it is very certain that none of them were concerned in the one under consideration: (1) None of the cases ate much rice; (2) beri-beri had never occurred before in the lines, and is very uncommon amongst the natives of the place; (3) all excreta were disinfected and there was no chance of a specific pollution of the soil. Very little is really known about the cause of beri-beri, and though many instances have been recorded where probably it was due to eating diseased rice or to inhaling or swallowing a toxin given out from infected soil, I do not think that these causes can account for its occurrence in every instance. I am inclined to believe Sir Patrick Manson when he states: "It is quite possible that several kinds of peripheral neuritis, each with its special cause, may have been included under the term beri-beri, which after all may only be like the word dysentery, a name for a group of symptoms produced by several diseases of the same tissues or organs and not of one

special disease of these tissues or organs." The symptoms I have described were, I believe, those of a disease belonging to the beri-beri group, not due to any of the accepted causes but to some toxin introduced not improbably in the beer, or produced by some fermentation in the alimentary tract caused by the beer. With very few exceptions all the men in the regiment drank beer, but it was evident that only those suffered who drank it to excess, a considerable quantity apparently having to be regularly consumed before neuritis appeared. Though some of the cases were true alcoholic multiple neuritis, which Daniels states is the disease most likely to be mistaken for beri-beri when the cause is present, as it certainly was in these cases, its occurrence as an epidemic at one period of the outbreak upsets the opinion that it was purely an alcoholic neuritis. It can only then be attributed to a beri-beri infection, not, however, originating from the commonly accepted causes but undoubtedly predisposed to, if not excited by, the excessive consumption of beer.

Treatment.—All the cases were kept apart as much as possible, and those whose symptoms required it were kept in bed—men with marked cardiac symptoms being most carefully watched. Soda sulphate 1 drachm was given daily, whilst the more severe cases were given a mixture of digitalis and strychnine. The diet was light and digestible. All the cases recovered and returned to duty after one to three months' treatment and rest, excepting one who died and two who were invalided. The fatal case was treated with digitalin, strychnine, amyl nitrite, trinitrin, and venesection. When the troops went into camp the barrack rooms were cleaned and whitewashed, but these precautions were really not necessary as there was no possibility of any place infection.

NOTES FROM KORDOFAN ON TWO CASES OF FEVER ASSOCIATED WITH SPIROCHÆTES IN THE BLOOD.

By Captain A. B. Cummins.
Royal Army Medical Corps.

On November 5th, 1909, a large draft of men arrived in El Obeid, Kordofan Province, Anglo-Egyptian Sudan, from furlough in Egypt. These men belonged to the 3rd Battalion, which is at present stationed at El Obeid.

On November 11th two of these men reported sick with fever. The blood of both men was on the same day submitted to the routine examination for malarial parasites, and in both cases with negative results. On this occasion no spirochætes were noted in the blood of either of the men.

Case 1.—Private S. Z., 3rd Battalion.

November 11th, 1909.—Temperature ranged from 103° to 104° F. Great prostration was present, and he resented being disturbed. The spleen and liver were not enlarged or tender. Some pain was complained of in the chest, but auscultation revealed nothing that could in any way account for the symptoms. Vomiting did not occur; headache was a marked symptom, and caused the patient great distress.

November 12th.—The temperature in the morning fell to 100·5° F., and was in the evening 101° F. There was, however, no abatement of the symptoms, and the case continued until the morning of November 15th practically unchanged. A second blood film was taken on this day and stained with Leishman's stain. On examination spirochætes in great numbers were found. On the evening of the same day crisis occurred, and the temperature fell to 95° F.

The next morning the patient, although weak, was quite comfortable.

Case 2.—Private M. A., 3rd Battalion. This man, who was admitted to hospital on the same date as Case 1, presented practically the same symptoms. Spirochætes were found in the blood on the same day as in Case 1, but the crisis occurred about twenty-four hours later.

Remarks.—These two cases were undoubtedly examples of what is known in Egypt as relapsing fever, and are of interest inasmuch as this disease, although common in Egypt, and, according to Sandwith, to a less extent in the Sudan, has up to the present never been recorded as occurring among Egyptian troops in the latter country. Stained films of blood were forwarded to Dr. Balfour, the Director of the Gordon College Research Laboratories, and he is of the opinion that the spirochætes are probably those of African tick fever, the *Spirochæta duttoni.* As far as I am aware, the spirochæte seen in Egyptian relapsing fever has not been identified, and it is quite possible that it is *S. duttoni*, and not the spirillum of Obermeier.

In conclusion, it is probable that these two cases among the soldiers of the 3rd Battalion were infected in Egypt while the men were on furlough, as, in spite of the large number of blood examinations that are carried on in the Egyptian Army, no cases of fever due to spirochætes have, up to the present, been recorded.

TWO CASES OF KALA-AZAR TREATED BY THE ARYLARSONATES.

By Major W. S. HARRISON and Captain C. C. CUMMING.
Royal Army Medical Corps.

It is often suggested that it would be more instructive if people published their failures as well as their successes in medicine, and the following two cases are reported from that point of view, since they were both failures.

The use of arylarsonates in the treatment of kala-azar suggests itself on account of the obvious close relationship of the parasite to trypanosomes, and on account of the successes which have been obtained experimentally in the treatment of trypanosome and other protozoal infections by these salts.

Manson[1] has recorded a case of kala-azar treated successfully in this fashion, but as will be seen by the following record in our two cases, very thorough use of arylarsonates had absolutely no influence whatever on the course of the disease either for better or worse.

Private R. S. was invalided from Naini Tal in June, 1909, suffering from kala-azar. The disease originated in December, 1908, at Dum Dum. His condition was then as follows: "He gets irregular fever and is anæmic. There is darkening of the skin of the face and the axillæ. His spleen is enlarged. The Leishman bodies were found in blood obtained by puncture of the liver."

He was despatched to England at once and arrived at the Queen Alexandra Military Hospital on July 25th, 1909, in the following condition: He was emaciated and debilitated, weighing only 8 st. 5 lb., his proper weight being 10 st., but as is so characteristic in kala-azar, he felt very little inconvenience beyond some weakness. The spleen was enlarged to within 1½ inches of the umbilicus, but was not tender, and he was suffering from irregular temperature, ranging between 99° and 102° F.

On July 27th, 3 grains of atoxyl were given by intramuscular injection, and continued at intervals of three days until August 25th, when the administration of soamin, by intramuscular injection was commenced in 10-grain doses on alternate days.

At the time the soamin was commenced, the spleen extended below as far as the level of the umbilicus and up to the cardiac dulness above, and the liver extended from the sixth rib above to two fingers breadths below the costal margin in the nipple line. His temperature was running an irregular course, varying between 104° F. and normal. He complained from time to time of tenderness over the spleen. His blood count at this time was: red blood corpuscles 2,425,000, white blood corpuscles 5,937, of which 57 per cent. were non-granular leucocytes.

On August 23rd the patient first began to complain of cough, and a few days later of soreness of the throat. This was accompanied by a considerable rise of temperature, and was found to be due to a mild attack of broncho-pneumonia. On this account the use of soamin was interrupted until the urgent symptoms subsided, a period of one week; the soamin was then continued until 100 grains in all had been given. There was no improvement in his condition during this time.

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[1] *Transactions of the Society of Tropical Medicine and Hygiene*, vol. ii., p. 169.

At the end of the course, fever of an intermittent type was still present, the body was much emaciated, and the skin of an earthy colour. There was considerable pain over the splenic region and in the left shoulder, and profuse night sweats had appeared. The spleen and liver were distinctly more enlarged, but the tongue was clean and the appetite good. At the same time there was no sign of the soamin having produced any ill-effects.

From October 6th he was given 8 grains of arsacetin, by intramuscular injection, every second day, until October 15th, when it was discontinued, as it was obviously doing no good.

On October 8th evidence of fluid appeared in the left pleura, and on October 13th a needle was inserted at the angle of the scapula, and 25 ounces of a pus-like fluid were withdrawn. The fluid stank abominably, and was loaded with innumerable bacteria and cocci. There was some temporary relief, but two days afterwards signs of pyo-pneumothorax appeared, and he gradually became worse, the breathing becoming more difficult, and the pulse more rapid and feeble. He died on October 19th.

The *post-mortem* examination, four hours after death, showed great enlargement of the spleen, which weighed 1,200 grammes, and of the liver, and areas of marked congestion of the large and the small intestines with minute petechiæ were seen, but there was no ulceration of the bowel.

The left pleural cavity was filled with a dark foul-smelling pus, and firm adhesions divided the cavity into separate loculi. The left lung was dense and contracted, and on section the tissue was leathery and compressed. The right lung was healthy and the right pleural cavity showed fine adhesions, especially at the apex and on the diaphragm. Smears from the spleen, liver, bone-marrow and the mesenteric glands, all showed Leishman-Donovan bodies in great numbers.

Private A. M. was admitted to the hospital at Lucknow on February 28th, 1909, suffering from febrile symptoms.

He had been three years at Barrackpore and Dum Dum. During the time he was at these places he had been in hospital four times for "ague" and once for jaundice.

On admission at Lucknow he had headache and constipation along with fever of a remittent type which continued all the time he was there, except for about a month during which the temperature remained normal.

On April 12th he complained of cough and of tenderness over the liver. On April 22nd the liver symptoms and cough had improved but the wasting had increased.

He continued in much the same condition until June 24th, when it is recorded that he felt fairly well, his appetite was good and he was putting on flesh. The spleen and liver were enlarged and the abdomen tense. On June 30th liver puncture was performed and Leishman-Donovan bodies were found. He was then invalided to England.

On arrival at Woolwich, on August 8th, his condition was as follows: He was very thin and sallow; the skin being of an earthy tinge. The spleen was enlarged to a finger's breadth above the umbilicus and as far as the cardiac area; it was firm and smooth to the touch and not painful. The liver was normal in size and not painful. The punctured wound in the eighth interspace in the axillary line, made in July, had not healed, there being an ulcer of about the size of a half-crown surrounding the point of puncture.

During his stay in Woolwich the splenic dulness increased and the liver also enlarged, principally in an upward direction.

On August 24th he was transferred to the Queen Alexandra Military Hospital and he was found then to be sallow and emaciated. The spleen was greatly enlarged, extending to 1 inch above the umbilicus. The liver dulness began at the fifth rib and reached to the costal margin. Blood examination showed red blood corpuscles 4,620,000, white blood corpuscles 4,900, of which 52·5 per cent. were mononuclear.

On August 25th soamin in 10-grain doses was given by intramuscular injection and was continued until September 22nd, on alternate days, by which time he had received 100 grains.

On September 6th it was noted that the patient was doing well, that the temperature was lower but still ran up to over 100° F. in the evenings. The spleen was not appreciably diminished in size.

When the soamin was discontinued the number of white cells was 2,812 per c.mm. and there was no appreciable improvement, at the same time there were no symptoms of intolerance to the drug.

On September 30th the skin was very jaundiced. There was great wasting and emaciation. The spleen was enlarged as far as the umbilicus but varied in size from day to day. The fever was now of an intermittent character, and he began to suffer from very persistent and troublesome hiccough which prevented sleep. A blood count showed red blood corpuscles 2,619,000, white blood corpuscles 3,412, of which 69 per cent. were non-granular cells.

On October 1st the intramuscular injection of arsacetin in 8-grain doses was commenced and was continued every second day till October 11th. He now became progressively weaker, day by day, and he began to have incontinence both of urine and fæces. A number of sores broke out on different parts of his body, first on the skin over the left elbow and then on the skin over the spine between the scapulæ and over the sacrum, commencing as bullæ, which later became filled with blood and then dried up, leaving an ulcer under the scab. No parasites were found in smears from the bullæ.

On October 21st the patient had a rigor, his pulse began to fall rapidly and he fell into a semi-comatose state and passed urine and fæces involuntarily. The temperature had risen to 105·2° F. by the evening, his pulse became barely perceptible, and he died the following morning.

The result of the *post-mortem* examination was as follows: The body was very emaciated. The abdomen contained 1 pint of blood-stained exudate, but there was no peritonitis. The spleen weighed 2,270 grammes and showed evidences of old perisplenitis in patches. The liver was also enlarged. The intestine was congested, but no ulceration was present. In smears from the liver and spleen no Leishman-Donovan bodies could be found, but abundant streptococci were present. These were also present in the bone-marrow, where only one Leishman-Donovan body was found after considerable search.

This almost complete absence of parasites was unexpected. It is possible that it is connected with the administration of senega on the last five days of his illness, but on the other hand Private R. S., who also got senega in the same dose for four days, had abundant parasites in his organs. Another possibility is that it was connected with the acute streptococcic infection which terminated the illness. The use of senega was begun on hearing through Sir William Leishman that Captain Ensor, R.A.M.C., had been getting promising results with this drug, but it hardly had a fair trial in these two cases as the patients were already almost *in extremis*.

Lecture.

SUBSTANCE OF A LECTURE [1] ON PUNCTUATION AND STYLE.[2]

By Colonel Count GLEICHEN, K.C.V.O., C.B., C.M.G., &c.

I have been led to put these few notes together, on punctuation and style, by the evident want of knowledge as regards both which I have come across in some of the very numerous reports on all sorts of subjects which it is my unhappy duty to read.

To take punctuation first:

Now punctuation is a subject which is, as far as I know, never taught in schools. Fellows are supposed to know it by instinct, like geography and English history and the art of writing and knowledge of the stars, and various other useful subjects which are totally neglected at school. I only happen to know something about it because I happen to have been taught it, by a foreign tutor, before I went to school, and the principles have somehow stuck in my mind. There are no rules, however, without

[1] This is only the framework. The lecturer illustrated and explained it *vivâ voce*—impossible to reproduce textually.

[2] Printed by permission of the Director of Military Operations.

exceptions, and very few of the rules I shall give you are absolutely hard and fast. But do not take the rules I give you as merely rules to be learnt off by heart and applied dogmatically. Get the hang of the thing, the construction of the sentence, and the rules of punctuation will come automatically. Sense—both common-sense and the sense of the sentence—has a great deal to do with good punctuation. In fact one may say that punctuation is merely the application of common-sense.

The object of punctuation is, of course, whilst making the meaning of the writer clear, to classify the different parts of the sentence so as to render them subordinate to the main idea, which should stand out in a clear and striking manner.

As an instance of the want of punctuation:—

We all know the celebrated sentence: "King Charles I. walked and talked half an hour after his head was cut off."

Here is another:—

"The I.O.'s of Divisions had no communication with other Divisions or with the D.M.I. except by writing through the Directing Staff."

(Susceptible of being read in three different ways, according to punctuation or the want of it.)

"Hence he considered marriage with a modern political economist as dangerous."

"Most of the roads are paved with a strip of small cobbles down the centre."

"It was and I said and not or."

The main principle therefore to remember is this, that you should treat your sentences as divided into one main group, expressing the main idea of the sentence, and other side groups subordinate to the main group; and punctuate accordingly by dividing these off from one another by some sort of stop, *e.g.* (main sentence underlined):—

"<u>I shall ask for roast beef,</u> if there is any."

"When I reached the station, <u>I found the train already gone.</u>"

"<u>He told me that</u>, although his motives might be misjudged, <u>he was convinced that he had done right.</u>"

"<u>Napoleon,</u> true to his economic heresy that exports alone enriched a State while imports weakened it, <u>allowed Italian ships freely to export corn and other produce to England</u> in that terrible year of death, in the hope that the high prices obtained for them would impoverish England and bring to Italy wealth sufficient to enable her to meet the heavy drain of the yearly subsidies to Paris."

Even though the main group may be a very long one, no stops should be used if there are no groups or ideas subordinate to the main one, *e.g.*:—

"The quiet unostentatiousness of its salutary methods is in such glaring contrast with the panic-stricken philanthropy intermittently shown towards our unemployed as to make the British visitor feel that in this

domain he has still a great deal to learn from such a system as is explained above."

Sometimes there are several main groups in a sentence, and in this case it becomes a question whether they should be separated by full stops and therefore made into separate sentences, or whether a semi-colon (the next longest pause to a full stop) would suffice, *e.g.*:—

"The sides of the mountain were covered with trees; the banks of the brooks were diversified with flowers; every blast shook spices from the rocks."

You might divide them off by full stops; but here the semicolon is preferable in order to bring them all into one sentence and so form a single picture—that of fertility; this is a matter of style more than of rule.

Complete sentences—*i.e.*, with subject and predicate—as above, should never be separated by commas only, unless closely connected together, both in sense and by particles. One of the most common forms of error in punctuation is a sentence such as this:—

"The report is divided into three parts, the first contains an account of the actual manœuvres, the second consists of a description of the terrain, the third brings to notice the peculiar tactics adopted by the Red Army," &c.

There should, of course, either be a full stop after "parts," with semi-colons after "manœuvres" and "terrain"; or else, if you want to make the whole into one sentence, keep the first sentence as the main one, and make the remainder subsidiary, thus:—

"The report is divided into three parts, the first containing an account of the actual manœuvres, the second consisting of a description of the terrain, whilst the third brings to notice the peculiar tactics adopted by the Red Army."

Or else, since firstly, secondly, and thirdly are closely connected, you might write it:—

"The report is divided into three parts. The first contains an account of the actual manœuvres, the second consists of a description of the terrain, and the third brings to notice the peculiar tactics adopted by the Red Army."

As the *comma* is the most frequent offender, we will tackle him first.

It may be news to you that it was only introduced into English literature in the sixteenth century.

A good general rule is to use as few commas as possible; the erring reports which I have read always suffer more from a plethora of comma than from a deficiency thereof.

Commas are, after all, the main form of stops for dividing up a sentence; and though they are often wrongly used as substitutes for colons, semi-colons, dashes, and even full stops, it is a worse fault to put a comma where it is not wanted, or to leave it out where it is, than to use it merely in substitution for other stops. If, therefore, we get our ideas

right about commas, we shall not do so badly with the other stops, for they are much easier to deal with.

Broadly, therefore, we can say that commas should only be used when we want, with a light touch, to divide off groups from each other or to break the continuity of ideas. To necessitate the use of such a small stop as a comma, the separation of ideas need be very trifling: the break may even represent merely a slight pause in one's thoughts (on paper), but that is where the comma comes in. If you want to separate your ideas more strongly, you use a semicolon; and if you want to separate them absolutely you use a full stop; it is the comma, however, that represents the slight pause or break in one's written thoughts, that divides off the subsidiary groups from the main group, and the sub-subsidiary groups from the subsidiary ones:—

"The Sultan and his advisers, in face of this aggression, which appeared to be quite uncalled-for, gave proofs of inexhaustible patience and of wise moderation."

Sometimes the pause is so slight that one does not require a comma at all:—

"These facts however have sunk deeply into the national mind of Germany."

And sometimes, although a new idea is brought in, it all forms part of the whole, and therefore should not be fenced off by commas:—

"It is further evident that Turkey possessed the same brave uncomplaining soldiery."

The other day I came upon this appalling over comma'ed sentence:—

"Ever since the days of Frederick the Great, Prussia and her well-tried army, have enjoyed a large measure of respect, and admiration, in all quarters of the world."

There should, of course, be no commas at all in the above; it is only one idea throughout.

In many cases what appear to be subsidiary sentences are only expanded nouns, adverbs, adjectives, &c.; they should not therefore be fenced off by commas. *E.g.*, in the above sentence, "Ever since the days of Frederick the Great" only represents an adverb of time, and "in all quarters of the world" an adverb of place. You would not fence off "then," or "whilst," or "everywhere"—why then fence off these sentences?

Here is a sentence in which the sub-sentence merely represents a nominative:—

"To-say-that-he-endured-his-misfortunes-without-a-murmur is to say only what his previous life would have led us to expect."

We therefore put no comma after "murmur": for the subject and verb, unless separated by a subsidiary sentence which requires fencing off, ought *never* to be separated by any kind of stop.

"The warmest and most enthusiastic admirers of our naval institutions

and victories are to be found throughout the ranks of those whom we expect one day to fight."

There should of course be no commas after "victories," for subject and verb must not be separated; and there must be none after "those," for "those-whom-we-expect-one-day-to-fight" is merely a genitive in the guise of a sentence.

One of the most frequent pitfalls for the unwary is the question as to when you ought to put a comma before "and," and when not.

When the "and" connects merely two words, there should never be a comma.

(*a*) When the "and" connects two sentences:—

The rule is quite simple: when the subject (nominative) is repeated, you put a comma; when it is not you do not.

"He kicked her, and then he stabbed her."

"He kicked her and then stabbed her."

"The Bavarians are a musical race, and they sing well."

"The Bavarians are a musical race and sing well."

It is merely an amplification of our original rule, that separate complete sentences, *i.e.*, sentences with subject and verb, must be kept separate by some sort of stop.

This rule generally holds good; but sometimes, if the sentences joined by "and" are long, or express quite different ideas, or the repetition of the subject is obviously suppressed, a comma is by some writers inserted before the "and"; even if the subject is not repeated:—

"The tribunal discovered a reactionary conspiracy, and elicited the fact that many leading men were concerned in it."

It is however not wrong to leave the comma out.

"The Artillery Commandant had two guns set up, one at the entrance to the barracks, the other at the exit, and made ready to withstand the mutineers."

Here of course the comma before the "and" is correct: but it does not belong to the "and"; it is part of the fence of the subsidiary sentence "one . . . . exit."

(*b*) When two or more words are strung together, with commas in between, and there is an "and" before the last, there should not, as a rule, be a comma before this "and."

"Cheese, fruit, flowers and fish are to be had there."

"Tom, Dick and Harry."

If however the string of substantives is long and complicated, one may put a comma before the "and": but this really only represents a taking of breath, or a change of idea:—

"Nothing was to be seen in either case except a few tents for officers, warrant officers and sentries, and a few shelters for ammunition and supplies."

Here you have no comma before the first "and," but you should put one before the second one.

The comma before or after a relative pronoun also presents difficulties; but in nine cases out of ten the difficulty solves itself if you look at the main principles. Take these sentences:—

"The new Servian gun, which-is-obviously-borrowed-from-the-French-model, is the only weapon in this country which can be considered entirely satisfactory." Here "which . . model" is merely a subsentence.

"The-man-who-did-that ought to be punished." The first five words are merely the subject.

"The man who, by-pretending-to-be-sick, shirked the march ought to be punished."

"That man, whom I well know to be a bad character, is not worthy of your confidence."

Sometimes you would be justified in leaving out a comma:—

(*a*) "He would be shocked if he knew the truth"; but

(*b*) "If he knew the truth, he would be shocked."

The difference here arises from the fact that in the position of the words in (*a*) the sense of the main sentence is not complete till we have finished the whole sentence. In (*b*) the usual rule of separating complete sentences applies.

When words are common to two or more parts of a sentence and are expressed only in one part, a comma is sometimes used to show the omission:—

"London is the Capital of England; Paris, of France; Berlin, of Germany."

The *colon* is often misused. Its function is chiefly explanatory.

"The reason I give you for my decision is this: that I do not consider that the enemy could have reached the river in time."

"Three nations adopted this law: England, France and Germany."

"Dr. Johnson's chief works are the following: the Lexicon, Lives of the Poets, and Rasselas."

"The rain beat against the window: it was in fact a miserable day."

"The change of thought is great: from the sublime to the ridiculous."

It is used also in front of quotations:

"The passage in which he says: 'The law ought to forbid it because conscience does not admit it'—occurs in one of his most celebrated essays."

A long deliberate quotation is generally preceded by a colon and a dash, and starts on a new line:—

"He wrote as follows:—

"'I have named none to their disadvantage, &c.'"

It is also used for enumeration, where "namely," or "viz." is understood but not written.

"There were twelve tribes of Israel: Zebulon, Naphthali, &c."; but in practically all the correct uses of the colon the underlying sense is that of *explanation*. It should certainly not be used instead of a semicolon, which is quite a different stop.

The *dash* is perhaps often rather a slovenly method of punctuating when you are not sure what stop to use: but it has its uses. It is useful for separating off a sentence when commas are not sufficient, *e.g.*:—

"Five-sixths of the revenue repealed—abandoned—sunk—lost for ever."

"The normal meaning of the word—or rather, I should say, the absolute meaning—is so-and-so."

Or it may denote hesitation:—

"Well—I don't know—that is—no, I cannot accept it."

Or an unexpected turn of thought:—

"He entered smiling—and embarrassed."

A written conversation is often punctuated by dashes. It gives a more lifelike appearance: for people rarely talk in correctly punctuated sentences.

A dash also comes after a full stop after the side-heading of some paragraph:—

"Extent and boundaries.—On the north it is bounded by, &c., &c."

It is often used as a parenthesis:—

"It is stated that as their pay is so poor—only thirty shillings a month—they cannot afford to buy any liquor."

The *semicolon* is used to separate parts of sentences between which there is a distinct break, but which are too closely connected to be made into absolutely separate sentences fenced off by full stops:—

"Several positions were occupied in succession; one was held for a long time; at last however it was relinquished."

"They are fine upstanding animals, with plenty of bone; they appeared to be well looked after."

It must be remembered however that semicolons can only be used to fence off complete (subject and verb) sentences of which the sense is complete—as with full stops: whose use I need not explain.

Nor do I require to explain *inverted commas*, *brackets*, *marks of exclamation* or *interrogation*, or *italics*.

Hyphens: it is impossible to lay down any definite rule.

Style and Matter.

By style I do not mean an elaborate literary style, but a practical military one.

A good style is a thing which comes naturally from clear-headedness. A muddle-headed man will never have a good style. The main objects to strive for are: Terseness, simplicity, accuracy, clearness, short sentences. Macaulay is as good an author to imitate as any other—unless the writer has already a superior style of his own.

A good style cannot be taught by exact definitions, but a great deal can

be done to improve a bad style by studying a good one. If you have a vivid and picturesque imagination you can give it rein when you write on other than official military matters—but for goodness sake curb it when you are writing a military report: it is not wanted there.

Choose your words well: it is better, and leads to less friction and waste of time in the end if you spend a few seconds in selecting the right word, rather than write in an inferior word which does not express your meaning, and then have to explain it, or explain it away, in half a dozen muddled sentences. The English language is quite rich enough. The words are there right enough if you will only take the trouble to search for them. Select those words which mean a great deal, but mean it exactly, and do not waste your time on long sentences where one or two well-selected words would do. Cultivate condensation, not superfluity.

It is extraordinary how one man can tell you in three pages as much as, or even more than, another man can tell you in a dozen. I have suffered from many of the latter style of reports, and the worst of this superfluous style is that if you want to make a *précis* of it you cannot do it by cutting off pieces here or there: you have to read it, get the sense of it, and then rewrite the whole thing off your own bat—a frightful waste of time.

These superfluities of writing generally come from three causes. The first is that the man's brain is organically incapable of grasping a subject as a whole, and organizing it and distributing it; and so he drifts along from point to point, flying off at a tangent, coming back later on, putting the minor points in the important places, and relegating the important ones, so to speak, to the backyard; so that by the time the unfortunate man for whom it is intended has struggled through the lengthy report, he is not much wiser than he was at the beginning.

The second cause is that the writer is quite capable of organizing the subject he is writing about, but that he will *not* take the trouble to do so. He will not take the trouble to think out, for a minute or two, how the report ought to be presented so as to give the reader a clear picture of what the writer wants to impart, but he sits down and begins writing at once without arranging his ideas in sequence, and without settling beforehand which are the main ideas and which the subsidiary ones.

The third cause is that a man may be physically incapable of bringing a thing to a point, and *must* give all the details—relevant and otherwise—which refer to the matter. In fact, he has a meticulous mind, and is incapable of separating his facts.

The late Lord Salisbury, when preparing a speech, used to construct it carefully by first settling what the three or four main ideas were which he wanted to ram home on his audience, and then he would approach the first idea with preliminary remarks, gradually work up to that, and clinch it. Then he would treat the second idea in the same way, and so on, so that he always got to the main point after the ground had been

carefully prepared for it, and it was much more convincing in consequence. (No doubt many others do it, too, and are good to read and to hear;—but many more do not.)

In fact, for constructing a report, as well as for constructing a sentence, or a house, or work of any sort, you must think out your framework —and for that you must have a sense of proportion, knowing what to keep and what to discard, and how to arrange your main points so that they shall strike the reader in the clearest and most convincing way. Sir T. Sanderson, who used to receive an immense number of despatches and reports from all parts of the world at the Foreign Office, used to retain the sense of all of them in a most extraordinary manner. I once asked him how he did it, and he said, "Oh, I never read more than the last page of a despatch—I really haven't the time." (This was perhaps an exaggeration !) He hardly ever used to read a despatch or a report right through, but knew by experience that the gist of the whole thing, the summing-up of the arguments and the impression intended to be conveyed by the writer, would be found at the end. If he wanted details, he would glance over the body of the report, and note them.

This, perhaps, presupposes good despatch-writing in the diplomatic services, but it serves as a good example for report-writers to follow.

Keep subjects apart, and put them under different headings—do not bungle up all together.

Orders are perhaps the most difficult things to write, for they require all the above-recommended virtues in the highest degree. They must be terse and absolutely clear, and yet must give the maximum amount of information and instruction, and they must be written in the right order. And here comes in a necessity above all things on which I have not yet laid weight—that of re-reading what you have written before you despatch it. In order to make things absolutely clear you must imagine yourself to be the officer receiving the orders (similarly as to report), with a clear mind as to what the officer knows already and what he does not know, and only then will you be in a position to detect flaws in the orders. Punctuation is also of the greatest importance; and of even greater importance is it that no order or sentence should be capable of being read in two different ways.

"Sloppiness" should be avoided: here are some instances of sloppiness :—

"No. 2 rams the cartridge together with No. 4 into the breach."

"Yesterday Captain S. shot fifteen brace of grouse along with Captain J."

"After the early fight we were present at"—instead of "at which we were present."

"I could see them from the hill I was on"—instead of "on which I was."

"The main stream was broad and it's channels" (were) "numerous."

"A party of men are expected"—for "is expected."

Never use a split infinitive: such as, "he used to generally come." "To" should never be separated from its infinitive.

"Averse to" is wrong. "Averse from" is right. "Adverse to" is right.

"Very" takes an adjective or an adverb, not a participle. Say, "very much pleased"—not "very pleased"; or "very content"—not "very contented."

Concur *with* a person, but *in* a thing. "He concurred with the plan" is wrong.

Never use "and which" if you can possible avoid it.

(The lecture closed with other illustrations of bad style, and with instructions for drawing up road-reports.)

Reviews.

GUIDE TO PROMOTION FOR NON-COMMISSIONED OFFICERS AND MEN OF THE ROYAL ARMY MEDICAL CORPS. By Captain S. T. Beggs, M.B., Reserve of Officers, Royal Army Medical Corps.

This volume is a *précis* of those official books a knowledge of which is required for the promotion examinations in the Royal Army Medical Corps up to the rank of Staff-Serjeant. All the subjects are fully dealt with, and it will be found a great advantage to have the knowledge which is required collected together in a concise form in one book, in place of having to search through several. References are given for nearly all statements, so that those wishing to go more fully into any particular subject may readily refer to the official books.

The second edition which has just been published will be found to contain much new matter, such as the requirements for promotion to Staff-Serjeant, semaphore signalling, &c. The subjects of examination for Staff-Serjeant are dealt with at some length, and the chapters on documents and pay should be found of the greatest assistance to those studying for this examination.

The Sections on Company and Squad drill will be particularly useful to privates and junior N.C.O.'s preparing for examinations; who, though not provided with the necessary books, must pass in these subjects. The inclusion of stretcher and ambulance wagon drill appears somewhat unnecessary, as all ranks are in possession of a copy of the Royal Army Medical Corps Training Manual.

Part V., which deals with clerical and other duties in a military hospital, could with advantage be studied by practically all N.C.O.'s.

The book can confidently be recommended to all who are working for their promotion examinations; and in addition it should be very useful to company and other officers who, through some years of Indian service, have more or less lost touch with things appertaining to the interior economy of a company and of the corps in general.

"Practical Microscopy." An Introduction to Microscopical Methods. By F. Shillington Scales, M.A., B.C.Cantab. Second Edition. London: Baillière, Tindall and Cox. Pp. 122. 5s. net.

This is the second edition of a book published in 1905 under the title "Elementary Microscopy," and has been very much enlarged.

Its object is to explain the practical optics of a microscope and the care and manipulation of the microscope and its accessories, and to assist in the choice of a microscope. It has chapters on photo-micrography and on technique, and explains the theory of dark ground illumination, and the ultra-microscope.

Anyone seeking advice in buying a microscope cannot do better than consult this little book. The author lays himself out for the beginner, but the book is so full of useful and valuable information that it will well repay perusal by anyone who, though not a beginner, has not taken the trouble to master his instrument, and consequently does not get full value out of it. There must be many such amongst medical men, as the use of the microscope is a subject, as a rule, absolutely ignored in our medical schools. J. C. K.

Manual of Military Ophthalmology. (For the use of Medical Officers of the Home, Indian and Colonial Services.) By M. T. Yarr, F.R.C.S.I., Lieutenant-Colonel, R.A.M.C.; Member Ophthalmological Society of the United Kingdom, &c. Second Edition. Pp. vii. + 228. London: Cassell and Co., Ltd.

The appearance of this little book in a second edition is to be welcomed. It is, as far as the writer knows, the only modern work on military ophthalmology by a British subject. The author's name is a guarantee to soundness of opinion, the result of prolonged experience both in the Service and at the first civil ophthalmic hospital of Britain.

The division and distribution of the subject-matter under consideration is unusual, but deliberate and necessitated by the relative importance of the various chapter-headings.

The opening chapters are elementary, but distinctly practical, especially for the general run of surgeons. A perusal and acquisition of the facts contained therein will be most useful to our brethren when dealing with ophthalmic cases. All doubts as to the diagnosis of refractive errors in cases for invaliding may, after perusal, be thereby removed, as well as a sound knowledge gained for general initial explanation of all eye cases. There is just one exception, on a minor point: the writer and most ophthalmologists press the superior claims of a plane mirror in retinoscopy; this is more a personal matter of use and custom than anything else.

Later chapters are more comprehensive and detailed. They deal with the commoner forms of disease and injuries met with in military and colonial practice. All reach a high level in expression and descriptive particulars. In this respect must be mentioned in the foremost place Chapter IX., which deals with malarial affections of the eye and quinine amaurosis. This is a pet subject of the author, and one on which he, as a deserved authority, is frequently quoted by other ophthalmologists.

This chapter is erudite and comprehensive and, though tough, a pleasure to read.

Chapters XII. and XIII., dealing respectively with the injuries of the eye and sympathetic ophthalmia, being subjects of greatest importance, have produced from the author a remarkably concise arrangement of facts, and expressions of experience in the happiest manner. Perhaps these are the most useful chapters in the book to the military surgeon.

In the division on gonorrhœal diseases of the eye there is one controversial matter, duly noted as such by Lieutenant-Colonel Yarr—that is, the question of the attempt to abort gonorrhœal ophthalmia in the first stage by the use of nitrate of silver. The reviewer is sorry that he is in the opposite camp to the author, and is of opinion that the chances of injuring the cornea outweigh the advantages to be gained by its general use, more particularly in the case of adults. The difficulty, to the writer's mind, is that the cases are rarely seen at the psychological moment for this procedure to be used as a routine practice.

The section dealing with gonorrhœal iritis and its frequency is justly and properly emphasised—let all refer to it. No mention, however, is made, in the matter of treatment, of the beneficial possibilities of a gonococcus vaccine.

The reviewer has not been able to find in the book any reference to Calmette's ophthalmo-tuberculin reaction, and when *not* to use it. This is an important practical point to the general military surgeon. Reference to this omission is hoped not to be too captious.

The last chapter deals chiefly with the commonest and most accepted operations of ophthalmic surgery in a practical way, as far as space permits.

In conclusion it may be said that the author has succeeded in enabling medical officers to "acquire the elements of ophthalmology without a teacher" to the highest extent that this is possible. This is the object of the book, as expressed by Lieutenant-Colonel Yarr in the preface to this the second edition.

E. C. H.

Observations on Rabies: with Special Reference to an Atrophic Form of the Disease occurring in Animals. No. 36 (New Series), Scientific Memoirs by Officers of the Medical and Sanitary Departments of the Government of India. By Major G. Lamb, M.D., I.M.S., and Captain A. G. McKendrick, M.B., I.M.S. Calcutta: Superintendent Government Printing, India, 1909. Pp. 34. Price 8 annas, or 9d.

In the Introduction the authors acknowledge that their observations are by no means exhaustive of the questions with which they deal, but they publish them as their respective spheres of work now lie several hundred miles apart.

They describe a form of chronic rabies in the rabbit. The chief symptom of this condition was progressive emaciation, and the usual symptoms of rabies as met with in rabbits (paralysis, tremors, &c.) were absent. Inoculation experiments showed that this condition was true rabies.

A series of experiments were made, with the object of immunizing monkeys against rabies by means of a single injection of fixed rabbit virus, in the hope that it might be possible to curtail the lengthy course of treatment now in use. The monkeys so treated were tested twenty-three days after the inoculation, by a small amount of fixed rabbit virus given subdurally. The results were disappointing—all the monkeys died of rabies. The authors endeavoured to make a quantitative estimation of the antibodies towards the virus of rabies in the sera of patients undergoing treatment, and of others who had completed their treatment twenty days previously. The sera of these patients showed no bactericidal action towards the virus of rabies.

The series of experiments would be more complete if observations had been made at a later period than twenty days after the completion of the treatment; the researches of Kraus and Kreissl are quoted, the results of which "tended to show that antibodies towards rabies virus only appear in the blood from twenty to twenty-two days after the treatment had ended."

We appreciate the difficulty of elaborating a technique which will demonstrate the presence of antibodies towards a virus the precise nature of which is, as yet, unknown.

A feature of the work is the concise summary at the end of each chapter. The publication contains evidence of much original and laborious work, and is an honest endeavour to add to our knowledge of the nature of rabies and to improve on the present methods of preventive treatment.

H. W. G.

Report of the Medical Officer to the Local Government Board for 1907-1908.

The present report, being the *Supplement* to the thirty-seventh Annual Report of the Local Government Board, is somewhat larger than that of last year, owing to the inclusion of a selection of five out of forty-five reports by the Board's medical inspectors on incidence of disease at particular places during the year. Dr. Newsholme summarises the principal points in his introduction. A fresh feature in this year's volume is an account of the work of the new department of Inspector of Foods, under Dr. G. S. Buchanan.

With reference to vaccination we notice that the position was not quite so favourable in 1907-08 as in the previous year; though as compared with the quinquennium 1893-97 before the Act of 1898, which practically abolished compulsion) the improvement is quite obvious. In that quinquennium 67·7 per cent. of children born in England and Wales were vaccinated, and 21 per cent. were "excepted," "postponed," or "remaining." Since 1898 the "acceptance" steadily rose from 61 per cent. to 75·8 per cent. in 1905, falling to 73·4 per cent. in 1906; the "abstention" fell from 26·6 per cent. in 1898 to 14·5 per cent. in 1904; in 1905 it was 14·8 per cent., and in 1906 it was 16·8 per cent. In 1893-95 nineteen counties and six metropolitan unions had 80 per cent. or more of the children that were born vaccinated; while nine counties and six metropolitan unions had less than 60 per cent. vaccinated. In 1906 twenty-three counties and ten metropolitan unions had 80 per cent. or more vaccinated; while five counties and seven metropolitan unions

had less than 60 per cent. vaccinated. The three counties of Bedford, Leicester, and Northampton are still at the bottom of the list, year after year, as are Bethnal Green and Mile End Unions.

Many of the enquiries as to incidence of disease related to diphtheria and scarlatina. At Bedale, Yorkshire, ninety-three cases of diphtheria occurred in 1907, chiefly among school children, and spread by personal contact; the same cause is noted at Cowden (Kent); Ringmer (Sussex), where twenty-nine out of thirty-seven cases were among school children; Thame, where forty-four out of sixty-two occurred amongst the scholars of the National School, and most of the others amongst their relations; and Winchcomb, where it was associated with unwholesome conditions at the schools. In fact, school influence appears to have accounted for most of the diphtheria that occurred in the period under review. The same is noted with regard to scarlatina at Burnham (Essex) and Cowden. Only two enteric epidemics appear to have needed investigation; that at Morley (Yorkshire) was associated with the midden-privy system and ineffective isolation. The outbreak at Leigh (Lancashire) presented several points of interest, and the report by Dr. Sweeting is printed at length. Leigh is a town of 40,000 inhabitants that is slowly converting its middens into water-closets, a process that will possibly be hastened by the occurrence of this prevalence of enteric during the last few years, averaging forty-three cases and ten deaths yearly. There was some history of personal infection, and sanitary defects of one sort or another were present in many of the houses invaded. The interesting point in the account of this outbreak is that Dr. Sweeting shows that colliers were affected much more than the other inhabitants (2·8 cases per 1,000 for colliers, 0·7 per 1,000 for "non-colliers"), an incidence not to be explained by their greater age-susceptibility. The reason suggested is the "marked inadequacy of the means provided for the reception of excrement voided by the persons employed at these collieries. Thus, at four of the seven, there are no means whatever provided underground; excrement is voided anywhere and anyhow." At others there is a scanty provision of pails (not universally used). Dr. Sweeting "heard of cases where colliers had been obliged to literally wade through fæces during their daily task, some of this adhering to their hands and beards." He thinks the matter "one of sufficient importance and gravity to be brought to the attention of the Home Office, and of the Royal Commission on Mines which is now sitting." This will meet with universal assent. It would have been interesting to know if any spread occurred in these colliers' families that might account for occurrence of enteric in non-colliers by contact infection. We venture to point out that the term "watershed" on p. 48 is used erroneously in the expression "the watershed consisting of 10,000 acres of moorland"; a watershed is a dividing line (Wasserscheide), not on area of ground. Dr. Wheaton's account of the sanitary circumstances of the Helmsley Rural District of Yorkshire reads strangely in the year 1909; there are still people—not in the extremity of poverty—living contentedly in cottages with undrained cowshed and pigstye under the same roof; "drawing drinking water from shallow wells in a loose soil near to leaky sewage catchpits, pools of liquid manure, and rubble drains containing stagnant sewage." The town of Helmsley itself appears to be in a condition of terrible filth in some parts. It is to be hoped that the publication of this report will stir up the local people to some sense of

their shortcomings; the description reads like what used to be the case a couple of generations back. Exactly sixty years ago Charles Kingsley wrote in regard to a similar state of things—"We want at once a short, pithy, stern, but not ferocious statement, that nothing has been done, or will be done, and why not; a plain avowal like Sam Weller's, 'Somebody must be whopped for this, and an attempt to define why.'" On p. 84 of the Report we are considering it is written: "There is a particular dairy in Helmsley which adjoins an uncovered privy-midden containing liquid filth, soaking into the ground beneath the floor of the dairy." It has been reported upon by the Medical Officer of Health. "Incredible as it may seem, nothing has been done to remedy the filthy and dangerous condition of the dairy at the time of my visit." We agree with Sam Weller.

A paragraph may be quoted from Dr. Johnstone's report on the sanitary circumstances of Sherborne rural district—a well-known dairying country—"Little or no attempt has been made to enforce the regulations adopted under the Dairies, Cowsheds and Milkshops Order. . . . The dairy farmers were more opposed to reform in the personal methods of their milkers than to any proposition in the way of improved ventilation and drainage in the cowsheds. (No doubt because such improvement is not effected at their expense, but at the landlords.') It was said by some farmers that the milkers would not submit to regulations for their personal cleanliness, and that milkers were very difficult to get. Other farmers said that if any such regulations were insisted upon they would abandon dairy-farming." When one knows how practicable it is, under good management, to carry out what is necessary from a health point of view, and how, even with the despised natives of India for dairymen, it is possible to have a really sanitary dairy, one loses patience with these agriculturists, and ceases to feel sympathy with them in the inevitable loss of trade that sooner or later overtakes them, from foreign competition, or even from intelligent and enterprising dairy-farming in this country. As the report continues: "The sooner men with these ideas abandon dairy farming, the better it will be for the health of the children and others who consume the milk."

There is a short account of the new department of food inspection, under Dr. G. S. Buchanan, assisted by Drs. MacFadden and Hamill; five reports have already been issued dealing with special enquiries as to imported meat foods; meat essences, the presence of lead and arsenic in tartaric and other acids, &c., which are here summarised.

Dr. Bruce Low contributes an account of plague prevalence, as usual: 1907 was the worst year India has yet experienced, the plague deaths having amounted to 1,315,880; Bombay, Bengal and Madras were not so severely visited; but in the Punjab, United Provinces, Burma and Central India there was great mortality, and the disease has now spread all over India. It has also increased in Egypt. Scattered cases are reported from all parts of the world in tropical and subtropical climates. Cholera was less prevalent in India in 1907 than in 1906; there was rather more in Bengal, but less in all the other provinces. It was also rather prevalent in Japan.

The scientific investigations reported in Appendix B of this year's volume are partly continuations of previous researches. Dr. Andrews furnishes a second report on the Bacteria of Sewer and Drain Air; it

bears out his previous report and the observations of Major Horrocks: sewage bacteria do exist in the air of drains and sewers, "but their presence is of a highly intermittent character"; the determining cause is probably droplet contamination from splashing; these droplets are extremely minute, and their contamination, even in the absence of air currents, appears to extend some 14 feet horizontally, and 12 feet vertically, at least, from a focus of slight splashing or gurgling. The number of sewage bacteria in drain air is influenced by the volume of the sewage flow; and the relative number of lactose-fermenting coliform bacilli is in direct relation to the amount of fæcal matter in the sewage. Dr. Andrewes and Horder report on the Behaviour of Leucocytes in Relation to Infection by, and Vaccination against the Pyogenic Cocci; and Drs. Horder and Gordon furnish a preliminary report on Protective Agents in Meningococcus Infections. Dr. Savage contributes an account of the Bacteriology and Pathology of Garget, and a further report on Gaertner organisms in the animal intestine; the bearing of the results obtained upon the etiology of food poisoning is considered, with a prudent absence of dogmatism. Referring to *Bacillus paratyphosus B* and the different meat-poisoning bacilli, Dr. Savage says that "culturally they are indistinguishable. . . . It is a possible supposition that they are identical, and that the different clinical picture is conditioned by the method of infection, the virulence of the infecting organism, and the resistance of the patient. Dr. Savage says in conclusion: "I have not dealt with the possibility that the allied organisms found may be causedly related to the true Gaertner infections by a change in their biological properties, since I know of no experimental evidence to support such a conception." There is no one better qualified than Dr. Savage to devise and carry out such an experimental research. The volume concludes with a further report on the pathogenic effects of *S. fæcalis* by Dr. Sidney Martin. A. M. D.

Current Literature.

The Practical Value of the Various Methods of Disinfecting Rooms by Formaldehyde without the Use of Apparatus. By Staff-Surgeon Dr. Bœhncke.—The size of the room used in the experiments varied from 14 to 67 cubic metres. The bacilli experimented with were typhoid, coli, staphylococci, and the spores of anthrax. The method of Doerr and Raubitschek proved the best with a failure in only 1·2 per cent. The modification of this method by Loesener was the next best, a failure in 4 per cent. The author had an accident in making this experiment after Loesener's method, and on repeating the experiment complete sterilisation was attained. The Autan process gave a failure in 7 per cent., and the autoform process a failure in 21 per cent.

As regards price, the cheapest of these methods proved twice as expensive as a disinfection carried out with an apparatus. The author does not therefore recommend their use except where it would be impossible to carry the apparatus. J. A. B.

The Methods of Disinfection of Rooms by Formaldehyde and Potassium Permanganate, their Yield of Gaseous Formaldehyde and their Practical Value. By Staff-Surgeon Dr. Kalähne and Staff-Apothecary Dr. Strunk, of the Kaiser Wilhelms Akademie (*Zeitschrift für Hygiene*, vol. lxiii., 1909, p. 375).—The mixture of formaldehyde solution and crystals of potassium permanganate causes the oxidation of the former to formic acid and carbonic acid, accompanied by the evolution of considerable heat. Evans and Russell have made use of this process to disinfect rooms. They employed an excess of formaldehyde solution, a part of which became vaporised owing to the heat evolved by the chemical process. Reports on this method have been satisfactory, though in details it might possibly be improved. It is possible, for instance, that the amount of water to be vaporised might be increased. It is a well-known fact, of course, that the full bactericidal effect of the formaldehyde can only be obtained when the air of the room to be disinfected is fully saturated with water vapour.

Evans and Russell, and later Base, have endeavoured to estimate the amount of formaldehyde actually vaporised. Direct methods have not been successful. One of the authors has worked out an indirect method based on the estimation of the oxidiser, *i.e.*, the permanganate which had been consumed in the process.

Having satisfied themselves of the accuracy of their proposed method by some preliminary experiments, the authors next proceeded to determine in what proportion of the ingredients (water, formaldehyde, permanganate) the best results would be obtained. They found that the best was 1 part of formaldehyde, 3 of water, 2½ of permanganate, thus the mixture of 100 parts of 40 per cent. solution of formaldehyde with 60 of water and 100 of permanganate is most suitable because the formaldehyde and water are in the proportion of about 1 : 4·5.

The next step was to determine practically the value of the process as a disinfector. The authors used a chamber of 40 cubic metres. The subjects of their experiments were *Bacillus typhosus*, *B. pyocyaneus*, *Staph. pyog. aureus* and spores of earth bacilli. These were exposed to the formaline vapour for five hours. The spores had been dried on garnets or silk threads; the other organisms were on pieces of linen which had been soaked in emulsions of the respective microbe. Complications were introduced by placing some of the organisms in an incompletely closed cupboard and wrapping others lightly up in paper. Controls were of course made. The test objects were placed in three positions, on a small cupboard about 0·80 mm. from the floor, in the cupboard, and on the floor of the room.

The first series of experiments was made with formaldehyde in solution. In the first instance the reagents were used in the proportions (formalin, water, and permanganate 1 : 1 : 1) indicated by Doerr and Raubitschek. All the vegetative organisms were destroyed; all the spores showed growth, those in the cupboard and those wrapped up on the floor at once, the others at intervals of one or more days. The authors next tried the same ingredients, but in the proportions they themselves recommend. The best results were obtained with the proportion—formaldehyde, water, and permanganate 1 : 2½ : 2½. For a room of 40 cubic metres, 1,000 cc. formalin, 1,000 grm. permanganate, and 400 grm. of water were used. The spores standing free on the cupboard did not grow; the growth

in the other spores was much delayed. The temperature of the room before the experiment was 17° C., and at the end 16° C.

The next series was conducted with the autoform method. In this the formaldehyde has been for convenience combined with a soap, and as such is called festoform. The authors remark that the festoform attacks the tins in which it is contained and is inconvenient to handle, that there is no gain in lightness, and that the preparation is expensive. In their first experiment they used 1 kg. of festoform, 1 kg. of permanganate, and 1 kg. of water. The result was not very satisfactory. *B. typhosus* and *B. pyocyaneus* were destroyed, as was the staphylococcus on the cupboard. But the staphylococcus on the floor and in the cupboard showed growth. All the spores survived, and with one exception showed growth at once.

The authors next used the same ingredients in the proportions recommended. The result was better. None of the staphylococci now survived, and the growth of the spores was much delayed, and in one case destroyed.

The next experiments were made according to Schneiders-Formangan method with a fresh preparation; the results were satisfactory in so far that all the vegetative organisms were destroyed, and that the growth of the spores was much delayed. But this preparation does not keep, and the authors found that a specimen which they left in the room for six weeks was absolutely useless.

The Autan method was next tested. It proved unsatisfactory. The spores showed growth in every case, as did most of the staphylococci, and in one experiment the *B. pyocyaneus* also survived.

As a comparison the authors next made the experiment with the Breslau apparatus. All the vegetative organisms were destroyed, and all the spores on the cupboard, and the spores that escaped, except those wrapped up in the cupboard, had a much delayed growth.

All the methods which have been mentioned as satisfactory up to now suffered from the drawback that in them the formaldehyde is not in an easily portable form, and therefore not suitable for use in the field. It had hitherto been found that the combination of paraform and permanganate did not cause a satisfactory evolution of formaldehyde vapour. The authors tested this conclusion, and found that the unsatisfactory results were due to the presence in the paraform of acids, principally formic acid. If these acids were neutralised by the addition of alkalies, the evolution of vapour was very satisfactory. An important item in the process was that the paraform and permanganate should be well mixed, and the mixture well moistened with water throughout. An incidental advantage was that this mixing was carried out in much smaller vessels than could be used in any other process. The vessels had to be of iron.

The authors made various experiments to determine the best proportions of the ingredients. They recommend 1 part of paraform, 2½ of permanganate, and 3 of water. In a room of 40 cubic metres, 400 grm. paraform, 1,000 grm. permanganate, and 1,200 grm. water, with the addition of 1 per cent. of calcined soda to the paraform. An addition of more soda causes the evolution of the formaline vapour to be so rapid that the disinfector cannot complete the mixing of the materials satisfactorily. The paraform must be well powdered and the permanganate in crystals.

As a result of practical experiments with this method it was found that all the vegetative organisms and the spores on the top of the cupboard

were destroyed. The remaining spores grew, but, with the exception of those wrapped up on the floor of the room, their growth was delayed. It should be noted that in this method the permanganate must be used only as crystals.

The authors then criticise unfavourably an American patent based on the admixture of a large quantity of alkali to paraform, and summarise the advantages of the method they recommend as follows:—

As compared to Autan it is cheaper, more efficacious, permits the use of smaller vessels, and does not tend to incommode the disinfector so much.

As regards the methods of using formaline solution, it has the advantage of using only solids and thus being more portable, and requiring smaller vessels and also incommoding the operator less. J. A. B.

Kapselbildung und Infektiosität der Bakterien (Capsulation in Relation to the Pathogenicity of Bacteria). By Ernst Sauerbeck (*Zeitschrift für Hygiene*, 1909, vol. lxiii., part 2).—The author commences by remarking that most observers take the view that capsulation raises the resisting power and thereby also the virulence of bacteria. Has capsulation, then, a direct relation to the pathogenicity of the bacterium? Is it the result of the adaptation of the bacterium to the animal or human organism? Certainly all known capsulated organisms, with one possible exception, are pathogenic, and the formation of capsules appears only to take place in the animal or human body in the two most well known species, pneumococcus and *Bacillus pneumoniæ*. The author then mentions three cases of his own. In a fatal case of otitis media the *B. pneumoniæ* was found capsulated, and in a fatal case of pneumonia a capsulated streptococcus, and finally in the sputum of a third case a capsulated sarcina. As the latter retained its capsular form in cultures, an opportunity was given to determine experimentally the value of the theory that capsulation and pathogenicity always went together. The sarcina proved fatal to mice, white rats and guinea-pigs, but had no effect on rabbits. The coincidence is therefore not universal.

J. A. B.

Vergleichend-epidemiologische Betrachtungen über die Cholera in Moskau und St. Petersburg (Comparative Notes on the Cholera Epidemic in Moscow and St. Petersburg). By Dr. Philipp Blumenthal (*Zeitschrift für Hygiene*, 1909, vol. lxiii., part 2).—In the cholera epidemic of 1908 St. Petersburg had 9,000 cases with 4,000 deaths, Moscow sixteen cases, of which about half were imported. The author rightly remarks that this remarkable contrast calls for a comparative study of the sanitary condition of the two cities. They are shown to be as follows: Moscow, though much overcrowded in its poorer quarters, possesses a satisfactory water supply and has a water-carriage system which is continually being extended. St. Petersburg has almost every sanitary defect it is possible to have. It has no water-carriage system and the soil on which it stands is fouled through and through. In many of the streets there is no water laid on and the inhabitants are reduced to drawing their own water from the canals. Other parts of the town have water laid on, but the water is the unfiltered water of the Neva. The

remainder of the city has a supply of nominally filtered water. But as the filters have been unable to cope with the demands for water it has become customary to assist them by turning into the reservoirs for filtered water some 3 to 40 per cent. of unfiltered water. The water for the city is drawn from the Neva at a spot where the river flows through a manufacturing portion of the city. The factories discharge their effluents into the river at this spot, and besides that numerous drains open into the river either above or at the source of the water supply. Among these drains it may be mentioned are those of a hospital which at the time of the epidemic treated cholera cases and discharged their bath water into the river without previous treatment. In addition there is a large population living in boats and barges on the river. The marvel appears to be not that there was so much cholera in St. Petersburg, but that there was so little. J. A. B.

Mosquito Campaign in West Africa by Means of "Trous-Pièges." In the *Archiv. für Schiffs und Tropen Hygiene* (Band xiii., Heft 20, 1909) Dr. Külz describes an ingenious method which is employed in Conakry, French Guinea, for the destruction of mosquitoes. Dr. Blin, Senior Medical Officer of the settlement, had by careful arrangements succeeded in destroying all the mosquito larvæ in the breeding places, but was greatly annoyed by mosquitoes which were blown into the settlement from neighbouring swamps. He, however, noticed that these mosquitoes took refuge during the heat of the day in land-crab holes or hollows under the mangrove roots protected from sun and wind. He, therefore, hit on the idea of making a number of holes called "trous-pièges" in order to trap the insects. Each hole is about 16 inches long, its axis making an acute angle with the surface of the soil, the opening is directed away from the prevailing wind and not exposed to sunlight; shady spots under trees or bushes give the best results. About 8 a.m. mosquitoes take up their position in these holes and remain till about 4 p.m. Destruction of the insects is begun about 2 p.m.; gangs of six natives are employed, each of whom carries a stick about 5 feet long, having a bunch of tow or some absorbent material fixed to its end; the tow is saturated with paraffin oil and lighted. The bearer rapidly passes from hole to hole thrusting the blazing torch into each. A torch lasts about ten minutes, and six trained men using thirty torches can burn out 500 holes in one and a half to two hours; this requires about five pints of oil daily.

The holes should be about 15 to 20 feet apart; if there is much vegetation they can be placed somewhat closer together. After ten to twelve days' use, the soil absorbs some of the paraffin oil, the odour of which prevents the insects from entering the traps; fresh holes must then be dug. One native after a little practice can dig 100 of these holes a day.

In order to get some idea of the value of this procedure, Dr. Blin counted the mosquitoes found in ten holes, daily for fifteen days: the total number was 11,700; this was during the mosquito season.

The "trous-pièges" can also be used for capturing mosquitoes for the purpose of studying prevalence of different species, &c. To do this it is merely necessary to make a muslin cylinder large enough to embrace the opening of the hole, the other end of the cylinder being fastened to a glass jar. When the muslin cylinder is dropped over the opening the

insects can easily be frightened by pushing a fine twig into the trap-hole and made to fly into the jar; a string tied round the muslin keeps them imprisoned.

Dr. Blin has applied the same idea to the interior of houses. He constructed a pyramidal wooden box with side walls 16 inches in length, the opening 5 inches, and the back wall 2½ inches high, the width in front 8 inches and at the back 4 inches; a sliding door which could be propped open closed the entrance. The outer surface was painted dark grey and the inner black. In the morning Dr. Blin places this box in a dark part of the room, not exposed to draughts. About 3 p.m. he closes the door and pushes a piece of smouldering brown paper on the lid of a tin into the cage; this destroys the mosquitoes.

C. E. P.

Further Researches on Pappataci Fever.—An interesting report from the bacteriological laboratory of the technical committee of the Army Medical Service, Vienna, by Priv. Dz. R. Doerr and Priv. Dz. V. K. Russ, is published in the *Archiv. für Schiffs und Tropen Hygiene* of November 2nd, 1909. The principal conclusions are the following:—

(1) No person appears to be immune, but one attack protects the patient against fresh infection during the rest of his life.

Serum taken from a patient within twenty-four hours of the onset of the fever will, if injected subcutaneously into a healthy man, induce a typical attack of fever, commencing on the fourth day after the injection.

(2) The virus disappears from the peripheral circulation within forty-eight hours of the onset of the attack; hence a patient ceases to be a possible focus of infection after forty-eight hours, and need not be isolated after this period.

Doerr points out the great similarity between pappataci fever and yellow fever. In both the virus will pass through a filter, in each case the infection is carried by biting insects. In the case of yellow fever, hæmorrhages, diarrhœa, and black vomit do not occur during the first three days, *i.e.*, during the time when the virus is circulating in the blood. Franz states that in pappataci fever severe epistaxis and diarrhœa frequently occur, but never before the end of the second day of disease, by which time the virus has disappeared from the circulation. Apparently the destruction of the virus sets free toxins which in turn produce these characteristic symptoms.

(3) The action of atoxyl, trypanrot, saponin and sterile ox-bile on infected serum *in vitro* was also investigated. Trypanrot had no appreciable influence; saponin, on account of the irritation it produced, could only be used in minute quantities, which had no apparent effect on the virus. Twice the volume of ox-bile added to the serum delayed the onset of the attack by two to three days. Atoxyl in large quantities also had a similar action, and, moreover, the cases injected with atoxyl-serum had very mild attacks of fever. If experience confirms this result, and it is considered worth while, the procedure might be employed as a preventive inoculation.

(4) Different attempts to infect animals by means of virulent serum having failed, an attempt to investigate the action of animal serum on virulent serum was made.

One cc. of rabbit's serum, 1 cc. of fowl's serum, 1 cc. of human serum taken from a patient who had been seven days free of pappataci fever, and 1 cc. of serum from a man who had suffered from pappataci fever two years before, were in each case mixed with 0·5 cc. of virulent serum. The serum thus prepared was then injected into four healthy men. The animal sera failed to in any way influence the onset of the disease; the serum of the convalescent apparently delayed the attack, which was also very mild. The serum taken from the patient who had recovered from an attack two years before seemed to destroy the virus entirely, as the injection was not followed by any signs of illness.

(5) Filtration experiments. Virulent serum diluted five times with salt solution was with much difficulty filtered through a new close-grained Reichel and also through a Pukall filter. One cc. of the filtrate was injected. The Reichel filtrate produced a mild attack of fever, the Pukall filtrate did not cause any disturbance of health.

(6) The virus appears to be passed on to the young brood of phlebotomus. Doerr's reasons for this supposition are that all adult phlebotomi are destroyed in winter, while during winter and spring no instances of pappataci fever have been observed either as relapses or fresh cases. In the case of yellow fever, the virus is transmitted to the young stegomya. The first cases of fever are always mild—hence the virus appears to be diminished in its passage from the adult fly to its offspring, and to regain its virulence after passing through man again.

To confirm this hypothesis, Doerr had numbers of the first phlebotomus flies, which were found in early summer, sent to Vienna, where they were allowed to bite healthy persons. Only one man developed a very mild attack of fever.

(7) In order to undertake any prophylactic measures, we must find the breeding-places of the phlebotomus. Doerr quotes Grassi's statement that latrine drains are the chief breeding-places of the phlebotomus. He gives a rough sketch of Mostar, showing the hospital and barracks, together with their drainage system. The numbers of the phlebotomus in the barracks where there are open latrines emptying into cesspits certainly supports Grassi's views. Repeated careful microscopic examination of the contents of the cesspits, of scrapings from their walls, as also of the walls of the latrines, failed to reveal any eggs, larvæ or pupæ of the phlebotomus in the months of April, May or June. Large gauze cages were placed over the latrine seats all night with a lamp close by, but not a single phlebotomus was ever found. The phlebotomus is also found in newly-built houses with modern sanitary fittings.

Doerr finishes his report with a brief recapitulation and gives a full bibliography of the subject. C. E. P.

Correspondence.

TO THE EDITOR OF THE "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS."

SIR,—We are trying to get a complete set of the Journal to be kept in the Officers' Room of this Hospital.

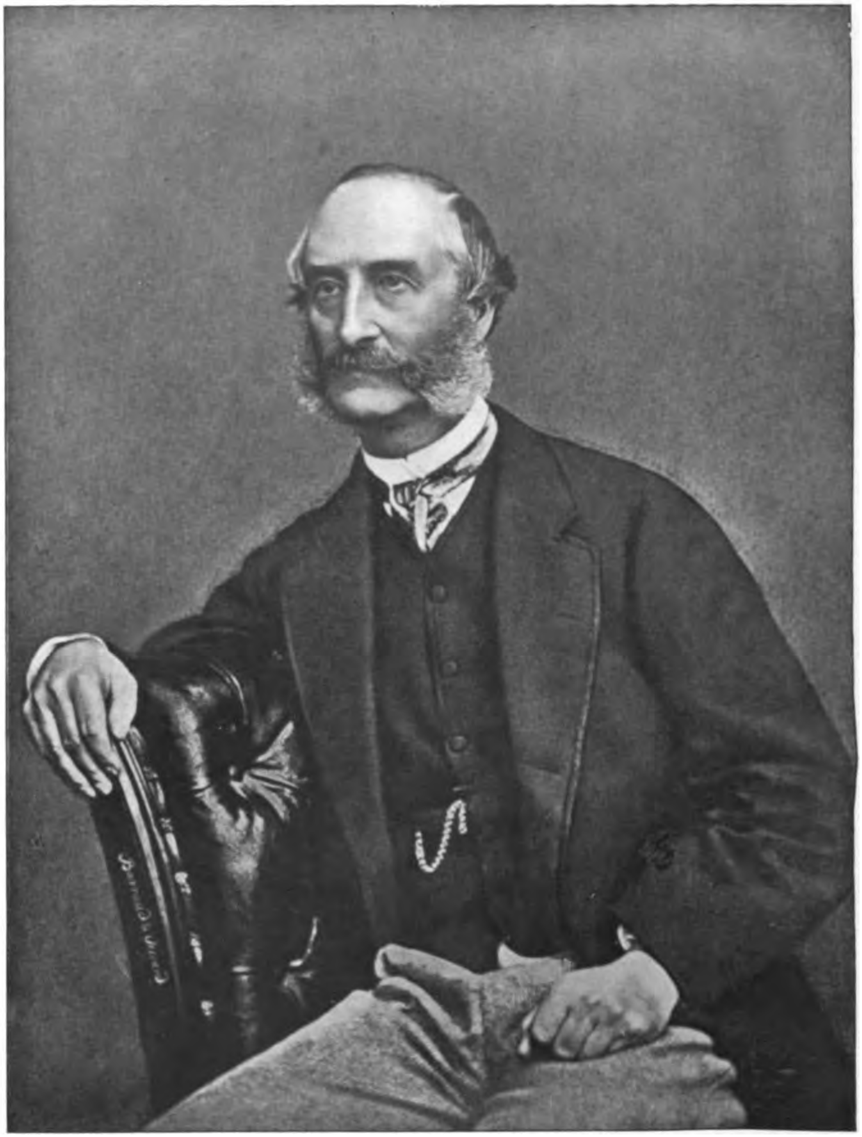
We have Volumes VI. to XII. complete, but want the following to complete the previous volumes:—

Vol. I., No. 3, September, 1903.
Vol. II., Nos. 4 and 6, April and June, 1904.
Vol. III., No. 4, October, 1904.
Vol. IV., No. 2, February, 1905.
Vol. V., No. 6, December, 1905.

We should be very much obliged if any officer who has copies of these numbers to spare would give them to us, or should any officer have one of these volumes bound which he does not particularly wish to keep for personal use, we should be glad to receive it.

I am, &c.,
W. T. MOULD,
Major R.A.M.C.

Military Hospital, Dover,
December 21st, 1909.



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THE LIFE AND WORKS OF EDMUND ALEXANDER PARKES, M.D., F.R.S. (1819-1876).

By L. C. PARKES, M.D.

"HYGIENE is the art of preserving health; that is, of obtaining the most perfect action of body and mind during as long a period as is consistent with the laws of life. In other words, it aims at rendering growth more perfect, decay less rapid, life more vigorous, death more remote. . . . . It is undoubtedly true that we can, even now, literally choose between health and disease: not, perhaps, always individually, for the sins of our fathers may be visited upon us, or the customs of our life and the chains of our civilisation and social customs may gall us, or even our fellow-men may deny us health, or the knowledge which leads to health. But, as a race, man holds his own destiny, and can choose between good and evil; and as time unrolls the scheme of the world, it is not too much to hope that the choice will be for good."—(Introduction to "A Manual of Practical Hygiene," by Edmund A. Parkes, M.D., F.R.S.)

EDMUND ALEXANDER PARKES, M.D., F.R.S. (1819—1876).

Edmund Alexander Parkes was born at Bloxam, Oxfordshire, on March 29th, 1819. His father, William Parkes, of the Marble Yard, Warwick, was a man of culture and high character; and his mother, Frances Byerley, was an authoress, several useful works, well known in their time, being due to her pen, amongst others a work on "The Domestic Duties," which passed through many

editions. To hereditary descent may be attributed some of the literary talent and thoughtful philosophical disposition which were leading characteristics of Edmund Parkes in his later years. Parkes received his school education at Christ's Hospital, London, and later proceeded to University College, London, for his professional medical studies. At University College he was much associated with his uncle, Dr. Anthony Todd Thomson; and in Dr. Thomson's laboratory he early acquired that taste for original research and that dexterity of manipulation which he afterwards put to so good an account. After a very distinguished student's career, Parkes graduated M.B. with honours at the University of London in 1841.

After leaving college, Parkes decided to join the Army, and was gazetted assistant surgeon to the 84th (York and Lancaster) Regiment in 1842. He went on service to India and Burmah, where he remained for three years, returning to England in 1845, when he retired from the Army. In the two years (1846 and 1847) following upon his retirement from the Service, Parkes brought out two works which were founded upon his medical studies and experience in the East. The first work is entitled "Remarks on the Dysentery and Hepatitis of India" (1846), and the second "Researches into the Pathology and Treatment of the Asiatic or Algide Cholera" (1847). The book on cholera was chiefly written in India, where Parkes witnessed two violent epidemics of this disease. Speaking of these researches, the late Sir William Jenner said, in an address to the Royal College of Physicians in June, 1876, on the "Work and Character of the late E. A. Parkes, M.D., F.R.S.": "These works (on dysentery and cholera) prove, more than all the many honours he obtained at his College and University, the amount of work he must have performed as a student—the real knowledge he possessed, knowledge only to be acquired by hard, continuous, unremitting work; and the varied character of that knowledge, chemical, microscopical, anatomical, and clinical. These works, had they been written by one who had filled the post of physician to a hospital for years, would be held to give evidence of high merit in their author; but when it is remembered that they are the productions of a man who had only then closed, and that at an early age, his college days, their merit must excite our surprise. But when, further, we call to mind that the clinical records and *post-mortem* facts were collected by a man who had just entered the Army, everything around him novel and enticing, at such an age, to legitimate idleness and pleasure; that they were collected by

a man to whom the complete discharge of his numerous official routine duties was a matter of conscience; that the records of clinical facts and of *post-mortem* appearances were made in India at the most trying season of the year, when the work of merely attending to the sick during a great epidemic must have been most laborious, our surprise at the merits of the works and our admiration for the man must, I think, be unbounded. Apart from the evidence these two works afford of Parkes's energy, power of work, and the wide extent of his knowledge, they prove that he possessed even then originality of mind, rare powers of accurate observation, and the ability to combine the facts observed and draw sound conclusions from those facts. Having regard to the age of their author, the circumstances under which the materials for them were collected, and their intrinsic merits, these two works are among the most remarkable in medical literature."

After leaving the Army, Parkes commenced practice in London, and graduated M.D. of the University of London in 1846. In 1849 he contributed papers on "Intestinal Discharges in Cholera" and on the "Early Cases of Cholera in London"—a disease which became epidemic in England in that year. In 1849 he was appointed special Professor of Clinical Medicine at University College, London, and Physician to University College Hospital. His clinical teaching was very highly appreciated; and he exercised much influence on his classes of students in the direction of inciting them to work and study and to put forth their best efforts in the accurate observation and recording of clinical phenomena. From 1846 to 1855 Parkes continued his work in London. He did not do much private practice, but he contributed largely to the medical press, especially the *Medical Times*, and subsequently the *Medical Times and Gazette*. In 1855 he delivered the Goulstonian Lectures on Pyrexia at the Royal College of Physicians. Parkes's health, whilst in London, was not very good, and he had an attack of pneumonia whilst living in Harley Street. In the light of his subsequent death at the age of 56 from disseminated tuberculosis, there is probably some foundation for the belief of his then medical advisers that the pneumonia was of tubercular origin.

During the Crimean War in 1855, owing to the inability of the base military hospitals at Scutari to cope with the enormous amount of disease that had resulted from the failure of the Government to realise the nature of the campaign the Army was engaged in, it became necessary to organise and equip an additional hospital near the seat of war. Parkes was selected by the Government to go to

Turkey, choose a site, and act as superintendent of the hospital when erected. Renkioi was eventually chosen as the site for the hospital, on the Asiatic side of the Dardanelles. The hospital was erected close to the coast, on an admirable site. It was constructed on designs prepared by Mr. Brunel, the celebrated railway engineer, and consisted of 30 wooden huts, each 100 feet long, 40 feet wide, and 12 feet high at the eaves. Each hut consisted of 2 wards, back to back, with 25 beds in each ward, the total accommodation being for 1,500 beds. Although these hospital wards were very far from being in consonance with modern views on hospital construction—as the wards were on the back-to-back principle, the windows under the eaves were very small, the w.c.'s and urinals were not aerially disconnected from the wards, and the sewage was carried away in wooden drains—still, they were undoubtedly a great advance on the system of utilising as base hospitals in war-time any building which could be made to contain a large number of beds. Brunel's designs were warmly approved by Parkes, who considered "that every arrangement was distinguished by that perfection of detail and excellence of method which stamp all the works of that eminent engineer."

The hospital was open for the reception of patients from October 2nd, 1855, to the middle of July, 1856, the total number of admissions from the seat of war being 1,331. A large proportion of the cases of sickness were spotted typhus, enteric, continued and remittent fevers, and dysentery. Parkes was evidently fully alive to the benefits to be derived from free ventilation and open-air treatment in diseases of this character, for he remarks that as soon as the men could crawl they were got into the open air. The pure breezes from the Dardanelles or the Ægean Sea soon brought strength to their enfeebled frames, and the period of convalescence was very short. "Of the whole number of 1,331 military patients, no fewer than 331 were furnished by the small corps of the Land Transport, or at the rate of 25 per cent. These men were admitted in a state which strongly reminded those who had been present at the time of the condition of the sick during the previous winter at Scutari. They were thoroughly prostrated, generally scorbutic, and presented the severest types of disease. They offered in all respects, both as to general appearance and cleanliness and as to severity of disease, a singular contrast with the soldiers of the Line. The men of the Land Transport Corps—hastily enlisted, and numbering many boys, and men considerably past their prime and quite unfitted to cope with the hardships of the Crimean winter—

had had necessarily thrown upon them all the hard work and the exposure which had been so fatal to all classes in the previous year." The 331 men of the Land Transport Corps furnished no fewer than 27 of the 50 deaths that occurred in Renkioi hospital, whilst among the 1,000 men belonging to the Line only 23 deaths occurred. Parkes speaks highly of the discipline that was observed in the hospital, of which he—a civilian—was in charge, and warmly commends the devotion to duty and untiring sympathy of the female nurses and lady superintendents.[1]

On his return from the Dardanelles Parkes remained in London until 1860, when in the month of March he was offered and accepted the Professorship of Military Hygiene in the recently created Army Medical School—the School being the outcome of the teaching of the Crimean War, and of the recommendations of the Royal Commission, presided over by Sidney Herbert, later known as Lord Herbert of Lea. Parkes continued to fill the Professorship until his death in 1876.

Referring to this appointment, the late Professor François de Chaumont, M.D., F.R.S.—who was for so long Parkes's chief assistant, and who succeeded to the Professorship on Parkes's death—wrote in an obituary notice of Dr. Parkes in 1876: "It showed the highest wisdom and foresight on the part of the late Lord Herbert and his coadjutors to select him [Parkes] for the important post he filled up to the time of his death, for he was unquestionably the man best fitted for it in the kingdom. The task he undertook was no easy one, for he had almost to create the science he was to teach, or at least to reduce it from a chaotic condition to something like order. Of course, much had been previously done by many workers; but it was all so diffusely scattered as to be only partially available for the public good." From the very first Parkes realised that courses of lectures were of little use in such a subject as hygiene, unless the student was made to apply practically the knowledge acquired in the lecture room. Laboratory work and laboratory demonstrations were from the very commencement associated with Parkes's teaching; and every student received from him the most careful and patient individual attention—the timid and slow were encouraged to persevere, and the able men were spurred on to further efforts.

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[1] "Report on the Formation and General Management of Renkioi Hospital on the Dardanelles, Turkey," by E. A. Parkes, M.D., late Superintendent of the Hospital, 1856.

In 1863 the Army Medical School was transferred from its original quarters at Fort Pitt, Chatham, together with the invaliding establishment, to the Royal Victoria Hospital at Netley. Parkes followed the School from Chatham to Netley, and took up his residence at Sydney Cottage, Bitterne, in the near neighbourhood of Southampton. In 1864 appeared the first edition of the "Manual of Practical Hygiene." This work has been truly described as a monument of industry, research, and clearness, which supplied a scientific basis—hitherto lacking—for the study of the principles of the dawning science of hygiene, and for their practical application in military and civil life. Many of the facts and scientific data contained in this volume were only arrived at after experimental work conducted by Parkes himself and his assistants in the laboratories of the new Army Medical School; and it is obvious that Parkes himself tested the truth of nearly every statement of fact contained in his book, and refrained almost entirely from reproducing, without verification, as known and well-ascertained facts the statements of the earlier writers in his chosen field of work. The "Manual of Practical Hygiene" reached its fourth edition in 1873, and was translated into many European languages. After Parkes's death, in 1876, the work continued to appear under the editorship of François de Chaumont and, on his death, of Lane Notter.

All the later years of Parkes's life were chiefly devoted to the elucidation of the science of hygiene, to its practical applications for the benefit of the British soldier, and to imparting his own knowledge to the young medical officers on the threshold of their Army careers.

In 1862 Parkes commenced an Annual Review of the Progress of Hygiene, which regularly appeared each year in the Army Medical Department Blue Book, until the year 1875. These reviews of home and foreign progress in the science of hygiene have been described as models of *précis* writing—clear and concise in their aims and exhaustive in their treatment. He also acted as Secretary to the Senate of the Army Medical School, a post which entailed a large amount of writing and correspondence. In addition to all this work, he was constantly engaged in protracted inquiries on behalf of the Government for the purpose of determining the value of various articles of food, or of different inventions bearing on the life of the soldier. Among his most important labours in this field were the invention and perfecting of the new valise equipment, and the abolition of the old cumbrous and oppressive knapsack, which were effected by General Eyre's Committee, of

which he was a member. The work entailed by this was very great, being spread over a very long time, and requiring attention to be paid to the most minute details; whilst no small part of it consisted in overcoming the prejudices of those who were inclined to think that what the new arrangement gained in comfort it lacked in soldierly appearance.

In 1861 Parkes was elected a Fellow of the Royal Society, and some of his best work is recorded in the *Proceedings* of that Society—namely: Contributions "On the Elimination of Nitrogen During Rest and Exercise on a Regulated Diet of Nitrogen," and on "A Diet without Nitrogen" (1867); "Further Experiments on the Effect of Diet and Exercise on the Elimination of Nitrogen" (1871); with Count Wollowicz, "Experiments on the Effects of Alcohol on the Human Body," and "Experiments on the Action of Red Bordeaux Wine (claret) on the Human Body" (1870); "Further Experiments on the Effect of Alcohol and Exercise on the Elimination of Nitrogen, and on the Pulse and Temperature of the Body" (1872); "On the Influence of Brandy on the Bodily Temperature, the Pulse, and the Respiration of Healthy Men" (1873).

Parkes was for many years of his life a total abstainer, but he never took extreme views, and in none of his works is total abstinence inculcated as physically essential or morally desirable so long as the individual is capable of extreme moderation in alcohol; but no man held stronger opinions on the evils of excess. His views on the issue of spirit rations to troops in the field are very well set out in his pamphlet published in 1875, "On the Issue of a Spirit Ration during the Ashanti Campaign of 1874, with Appendices on the Effect of Rum, Meat Extract, and Coffee during Marching, and the Use of Oatmeal Drink during Heavy Labour." On the whole, Parkes, like most modern observers, was strongly opposed to the regular issue of spirit rations, and believed that men can withstand fatigue, deprivations, and extremes of climate best if no alcohol is taken. It seems probable that Parkes's views on the advantages of extreme temperance were originally formed whilst he was in India with the 84th Regiment. In this regiment at that time there were many teetotallers (at one time more than 400 in its ranks), and the records showed that both in common tropical service and on marches in India the teetotallers were more healthy, vigorous, and far better soldiers than those who did not abstain.

Amongst others of Parkes's writings should be mentioned "The Composition of the Urine in Health and Disease and under the action of Remedies" (1860), a very able work on the clinical

side; "On the Causes of Sickness in the English Wars and on the Means of Prevention" (1862), read before the Royal United Service Institution; and, in conjunction with the late Sir John Burdon Sanderson, "Reports on the Sanitary Condition of Liverpool" (1871), a city which at that date presented the combined problems of poverty, disease (typhus), overcrowding, and insanitary conditions in their most acute and pressing forms.

In 1863 Parkes was elected a representative of the Crown on the General Medical Council, and in this position he made the happiest and most beneficial use of his great influence. His large and varied experience in different capacities and spheres of work, more especially his wide experience as a teacher and as a member of the Senate of the University of London, were all brought to bear on the questions of medical education with which the General Medical Council had to deal. In 1868 appeared in the *Lancet* his papers on medical education. These papers received great attention, and led to the institution of various reforms in the teaching of the student and his subsequent examination for a licence to practice. These reforms were not, of course, effected at once; and many of the measures advocated by Parkes are only now in course of adoption. His views were far in advance of his time, and were also too much opposed to traditional customs and observances to be realised except after many years of waiting.

It is rare that a man of robust constitution continues to get through such an amount of work as Parkes did in his fifty-six years of life; but it is simply marvellous that he should have accomplished what he did with his feeble frame and delicate organisation. The stress and strain of so many activities gradually wore him out, although his courage and nervous energy remained at their usual high level until the end of his life. During the winter of 1875 his health gradually failed, and a long illness—which was eventually shown to be due to disseminated tuberculosis—had its fatal termination on March 15th, 1876.

In Parkes were combined a brilliant intellectual endowment with moral and social qualities of the very highest order, which caused him to be loved and respected by all who knew him. He had absolutely no worldly ambition for himself. He steadily declined to accept any recognition of his great services from the Crown, although such was, on more than one occasion, urged upon him. So great was the innate modesty of his spirit that he could not bring himself to believe that his work was more worthy of recognition than that of his colleagues at Netley or elsewhere.

The guiding principle of his life was to make the best use of his capacities for the advancement of the truth in medical science, whereby would be gained the prevention and alleviation of human disease and suffering. By his friends and contemporaries Parkes was recognised as possessing a character of singular beauty, sincerity, and gentleness. The unconscious influence of his character and bearing exercised an extraordinary attraction upon those with whom he had any kind of relation; and there were, and still are, many who have benefited deeply and lastingly by his example and precept. He was not only himself desirous of leading the highest kind of life, but he was always eager to help those around him with sympathetic encouragement and advice to raise themselves to his own exalted standard. Although more than thirty years have elapsed since Parkes's death, those who had the good fortune to know him hold him still in grateful remembrance as the perfect type of man—the personification of all that is highest and noblest in humanity.

Of his influence upon the Army, and more especially upon the Medical Service of the Army, it is difficult to speak without using terms which to some may savour of exaggeration. Probably only by the few who are conversant with all the changes and reforms that the Army has experienced in the last thirty years is it at all clearly realised how the work and teaching of Parkes have inspired and underlaid the slow evolutionary process by which the Army has so much benefited. That it is better to prevent disease than to cure it; that the efficiency of an Army in peace or in war is dependent upon the health and stamina of its component units; that the medical service has as great a responsibility in the prevention of disease in the Army as in the care and treatment of the sick and wounded—these are great principles of which the truth is at last realised, and which are more or less practically applied in the organisation, administration, and equipment of the Imperial Army of to-day. But all these great principles formed the basis of Parkes's teaching, and were pressed for recognition upon the supreme military authorities of the country nearly fifty years ago. They might, even to the present day, have remained to a great extent ignored or unacted upon, had not the latest campaign, in which the bulk of the Imperial Forces of the Crown were concerned, shown how essential they are as guiding principles in modern warfare, and what a terrible penalty in sickness and death is exacted from the Army that fails to recognise that a sanitary service—fully equipped and organised for war—is indispensable, if the Army is not to be decimated by preventable disease.

PHLEBOTOMUS FEVER IN MALTA AND CRETE.

By Lieutenant-Colonel C. BIRT.
Royal Army Medical Corps.

Phlebotomus Fever in Crete.

The task of unravelling the tangled skein of "continued fever" in Crete is beset with greater difficulties than that of Malta. In the year of occupation, 1897, there were 785 cases of "simple continued fever" among 1,152 troops. It is stated that "febricula" was prevalent, but the incidence of enteric, Malta, and malarial fever was considerable.

In 1898 149 admissions for "simple continued fever," 39 for Malta fever, and 131 for enteric fever are recorded.

In 1899 108 cases of "simple continued fever," 1 of Malta fever, and 340 of ague appear in the Report.

In 1900 the "simple continued fever" admissions were 47 only; Malta fever, 7; ague, 133.

In 1901 147 cases of "simple continued fever" were returned in June, July, and August, but 1,393 admissions for ague in a strength of 564 men were also shown. It is stated that "ague" assumed an epidemic form in the summer. The earliest cases were observed in June, but the month of maximum prevalence was October. It seems probable that phlebotomus fever was epidemic at the same time as malaria.

In 1902 1,036 admissions among a body of 460 men are entered under the heading of "Ague." It is stated that a notable feature of the epidemic was the falling-off of the admissions shortly after the end of August. This suggests that "pappataci-fever" was then prevalent.

The year 1903 was more healthy. "Ague" had fallen to 222 attacks among 410 men.

The year 1904 was not remarkable. There were 8 admissions for "simple continued fever" and 133 for ague.

In 1905 the admissions for "simple continued fever" rose to 137, or 190 per 1,000 of strength. The average duration of each case was under a week. There were also registered 246 attacks of ague.

In 1906 the admissions for ague had fallen to 60, and those for "simple continued fever" to 39; the average stay in hospital of these latter was less than fourteen days.

In 1907 there were 71 cases of "simple continued fever," each of which had a mean duration of thirteen days while under treatment. Ague was responsible for 64 admissions.

In the Report for 1908 is the following table of admissions by months for "pyrexia of uncertain origin."

Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
—	1	2	8	3	12	33	9	17	10	1	—	96

It is remarked that "A large number of cases of mild fever occurred amongst the troops, both at Canea and Candia. They occurred during the summer months, and chiefly among young soldiers lately arrived from England. The fever had a duration from two to four days. In Canea 26 cases occurred among 56 men, from May 24th, 1908, to September 9th, 1908. They practically ceased as soon as the troops were moved to camp. Malaria was not prevalent in Canea. The blood of those attacked was free from parasites. In Candia febrile seizures were diagnosed 'pyrexia of uncertain origin' only after negative blood examinations."

1909. The seasonal prevalence of "pyrexia of uncertain origin," influenza, and ague till the close of July, 1909, is here shown:—

	Jan.	Feb.	Mar.	Apr.	May	June	July
"P.O.U.O."	1	1	1	—	8	28	35
Influenza	—	3	—	—	—	—	—
Ague	—	—	—	—	1	6	5

At the end of May, 1909, I was permitted to accompany the Principal Medical Officer, Malta and Crete, Colonel J. G. MacNeece, on his tour of inspection to the latter island. We found both in Canea and Candia cases of pyrexia, lasting three or four days, characterised by severe frontal headache, flushed face, heavy half-open eyes with injected conjunctivæ and tender eyeballs, pains in the back and limbs, tongue coated with white fur, constipation. No malarial parasites were detected. In short, we met with phlebotomus fever, identical with the Malta infection. Canea is exempt from malaria, yet these short febrile seizures have been noted every summer since the occupation not only amongst our own troops, but also in the Russian, French, and Italian contingents. We also discovered *Phlebotomi papatasii* in Candia and Canea similar in every respect to the Malta fly.

Major A. E. Master, R.A.M.C., informs me that in 1905 and 1906, when he was residing in Crete, he and other medical officers had no difficulty in immediately distinguishing cases of phlebotomus fever, then known as "simple continued fever," from ague, by clinical symptoms alone. The former obtained the slang name of

"pink-eye." In his Report of the Medical Transactions, Crete, 1905, he describes this ailment as forming an epidemic characterised by high fever, lasting four days on the average, headache, pronounced lassitude, and congestion of the conjunctivæ, and sudden cessation of the symptoms with some subsequent debility. He notes that the seasonal prevalence of "pink-eye" occurred in the early summer months, whereas ague did not appear before July.

Phlebotomus Fever in Malta.

The seasonal prevalence of fevers in Malta during 1909 is thus shown:—

	"Pyrexia of uncertain origin"	Enteric fever	Malta fever
January	3	4	—
February	1	—	—
March	1	—	—
April	8	—	—
May	8	3	
June	34	4	—
July	89	—	—
August	47	—	1
September	39	—	—
October	26	—	—
November	0	1	—

In	4 per cent. of the "Pyrexias of uncertain origin" there was fever for	1 day.
,,	16 ,, ,,	2 days.
,,	30 ,, ,,	3 ,,
,,	23 ,, ,,	4 ,,
,,	12 ,, ,,	5 ,,
,,	9 ,, ,,	6 ,,
,,	3 ,, ,,	7 ,,
,,	2 ,, ,,	8 ,,
,,	0·5 ,, ,,	9 ,,
,,	0·5 ,, ,,	10 ,,

Therefore in 85 per cent. of the cases of "pyrexia of uncertain origin" the temperature was raised for five days only or under.

Composite charts have been prepared by taking the mean of the observations recorded at corresponding periods of the illnesses lasting one, two, three, four, five, six, and seven days respectively.

Composite Charts of Phlebotomus Fever.

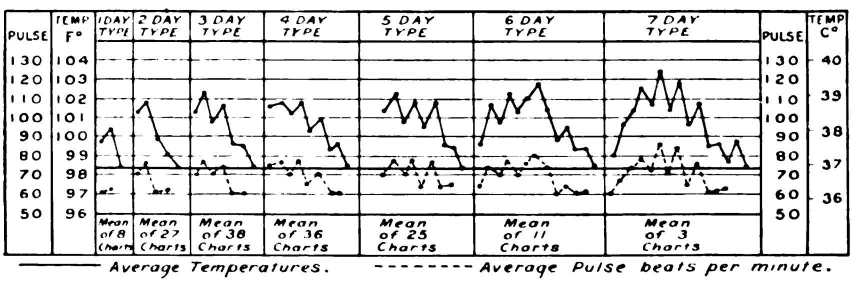

Chart 3.

Sixty-five per cent. of the attacks of "pyrexia of uncertain origin" occurred in soldiers who had resided less than a year in Malta. If we add the admissions among the troops in their second year, then 92 per cent. of the total number of cases of "pyrexia of uncertain origin" is the proportion of seizures in men with less than two years' service in Malta.

Spot maps show that the cases of "pyrexia of uncertain origin" were widely distributed. C Block, Floriana, Verdala, and the Royal Army Medical Corps' quarters, Cottonera, gave the largest proportion of admissions. Imtarfa, 630 feet above sea level, and St. Elmo Fort—strength 350—were almost exempt.

The onset of the fever returned "pyrexia of uncertain origin" is usually sudden, though sometimes a history of a few days' malaise makes it difficult to determine the beginning of the pyrexia. Chilliness, nausea, headache, heaviness and discomfort about the eyes, lumbar pain and stiffness of the muscles of the lower extremities, and somnolence, induce the patient to take early to his bed. He finds himself unfit for his duty next morning and comes for relief. His temperature will then be 101° to 102° F., and pulse slow, 70 to 80. His face will be flushed, eyes suffused and heavy, the tongue rather large and coated with a thin white fur, except at the tip and edges. There is no rash except from the effects of biting insects. The same evening the temperature may rise to 103° F., though without a corresponding increase in the frequency of the pulse. A fall of two degrees takes place next morning, which often is continued without a further rise until the normal standard is attained. Convalescence is rapid.

Nervous System.—There is marked drowsiness with disinclination to be disturbed. The headache is severe, but the severity is rarely so great as to cause the sufferer to clamour for its relief. The frontal region is chiefly affected. There is some mental depression. Hysterical symptoms have been noted once in a girl, convulsions in a child, and delirium occasionally in the adult. Tenderness along the course of nerves has been observed a few times.

Eyes.—The movements of the eyeballs, opening and closing the lids, which are often swollen slightly, are attended with discomfort. The eyeballs are tender on gentle pressure. The injection of the conjunctiva on either side of the cornea is marked, and is a prominent symptom. No subconjunctival hæmorrhages have been recorded. There is no watering of the eye, nor an icteric tint of the conjunctiva.

Nose.— Epistaxis has occurred but seldom. There is no coryza at any time.

Mouth, &c.—The tongue is large, moist, flabby, and is coated with a thin whitish fur, except at the tip and edges. Taste is impaired. It is rare that any soreness of the throat occurs. Sometimes small vesicles may be observed on the mucous membrane, but they give rise to no subjective symptoms. There is no expectoration from the throat or bronchi; loss of appetite is constant. Nausea is very frequent. Vomiting ushers in the attack in about a quarter of the cases. It may be repeated more than once. The matter ejected is tinged with bile. Constipation is commonly observed at some stage. Diarrhœa with watery stools has been noted in about 20 per cent. of the cases. It has never been very excessive or protracted. Occasionally blood has been present in the fæces.

Vascular System.—A slow pulse is a well-marked feature of the ailment. A pulse-rate of under 90 has been recorded when the temperature was 104·7° F. Rates as low as 40 have been registered during the course of the pyrexia. There is a moderate degree of leucopenia. The average of 35 estimations was 5,428 leucocytes per c.mm. Several counts have been under 2,500. There does not seem to be any great fluctuation in the number of the leucocytes from day to day. The leucopenia may continue into convalescence. The polynuclear leucocytes are diminished; they number about 56 per cent., instead of the usual 65 to 75 per cent. The large and medium sized mononuclears are increased; the lymphocytes and eosinophiles are decreased. No parasites are found in the living or stained films. The spleen is not palpable, nor is the splenic dulness increased. The urine sometimes contains a trace of albumin.

The skin is usually dry, though the patient may at times perspire freely. But the profuse sweating such as ends a fit of ague does not occur. There is often much dilatation of the capillaries of the face, which causes some puffiness of the eyelids and features, and gives a dissipated look to the sufferer. The erythema may extend to the neck and upper part of chest. Rashes are absent, except those caused by biting insects. Herpes on the lips has been noted twice. There is no jaundice.

Stiffness and pain in the back and calves of the legs are rarely wanting. The discomfort is increased by movement. Hence the patient usually lies quite motionless in bed, and may be averse from looking round about him on account of the uneasy sensations in

the external muscles of the eye. Tenderness on pressure of the muscles is infrequent. The joints are not swollen; pain is sometimes referred to the knees.

Every case has ended in recovery. The fever has not left any after-effects, such as neuritis, cachexia, &c.

Second attacks have occurred in 6 per cent. A recrudescence of the fever on the fourth or fifth day has been once or twice charted.

Blood has been abstracted from the veins in front of the elbow in twenty-three instances. Cultures on agar and in peptone broth and in peptone bile have remained sterile for weeks. If the needle of the syringe be sharpened on a hone and its point examined with a lens, the method of drawing blood from a vein in the forearm is less painful than a finger-prick. A blunt needle is a frequent cause of failure.

Serum agglutination examinations have been made in 47 instances Neither the *Micrococcus melitensis* nor *Bacillus typhosus*, nor *B. paratyphoid* A and B have been clumped by dilutions of the blood higher than what obtain in health.

Blood films have been stained by many methods, including that for deep chromatin, and have been examined with a Zeiss apochromatic 2 mm. N.A. 1·4. No malarial or other parasites, nor any structural alterations in the blood elements, have been discovered. Specimens of the living blood under the same power have shown no abnormality.

The following diseases have been excluded by these negative results: malaria, relapsing fever, trypanosome fever, Malta, typhoid and paratyphoid fevers, streptococcic, staphylococcic, tetragenous, pneumococcic and influenzal infections, and Rogers' "seven-day" fever, which he states is caused by a typhoid-like bacillus.

In sifting the patients' histories of the probable causes of the illness, the statement that they had been bitten by "sand-flies" occurs with the greatest frequency.

The "sand-fly" of Malta and Crete is the *P. papatasii*, which makes its appearance in scant numbers at the end of April and beginning of May, and becomes more numerous as the summer advances. It has been found in all places where those who have contracted the fever have resided. There is a correlation between the distribution of *P. papatasii* and the ailment. Where phlebotomi have been few or wanting, there has been also an absence of febricula; and where the phlebotomus has been abundant, there the fever has prevailed, often in the form of an explosive outbreak. In a large barrack-room which gave a daily supply of about a dozen

"sand-flies" to the laboratory, one case occurred, and was followed in quick succession by others, until most of the occupants of the beds adjoining the haunts of the fly had been attacked.

A small room in an old building on Suda Island, Crete, was used as a quarter for a detachment which consisted of an N.C.O. and five men. They all became infected, and passed through typical attacks of phlebotomus fever. Though none of them were aware of the existence of the phlebotomus, they bore marks of the bites, and Captain R. G. Meredith, R.A.M.C., and I captured over a dozen phlebotomi distended with their blood. The minute size of *P. papatasii* and their lightly coloured wings and body render them almost invisible in their flight, and therefore they often escape observation. Negative evidence as to the absence of the phlebotomus in a habitation must be taken with reserve. Only after a thorough examination of likely spots in the daytime is it possible to arrive at a reliable conclusion.

The phlebotomi select dark corners and recesses, away from light, glare, and noise, in which they settle during the day. Clothing hanging from pegs on the wall affords them a favourite retreat. They are attracted by the human odour. Many may be found in an inhabited room, but none in one next door which is vacant. Spider webs have no terrors for them; we have never seen them immeshed, and we have watched them fearlessly enter corners festooned with these traps. They elude capture with great facility on account of their sudden and rapid side movements. Large-sized glass-bottomed cardboard pill-boxes are the means we have employed in collecting the flies. A phlebotomus resting on the wall is slowly approached and then quickly covered with the pill-box. A card is inserted between the box and the wall. The fly, nevertheless, frequently effects escape while the card is being replaced by the cover of the box. By this means ten or a dozen flies may be caught in half an hour in a favourable locality; nearly 3,000 have been thus captured. The phlebotomus avoids painted surfaces. Its choice leans to white-washed, stone, or plaster walls. The study of the habits and life-history of *P. papatasii* has been pursued with great interest by the officers, non-commissioned officers, and men of the Royal Army Medical Corps. Colonel J. G. MacNeece, Lieutenant-Colonel H. Esmond White, Lieutenant-Colonel J. J. Gerrard, Major G. Crawford, Captains H. S. Anderson, M. H. Babington, P. J. Marett, J. B. G. Mulligan, P. S. Stewart; Lieutenants W. K. Beaman, H. G. Gibson; Serjeant-Major R. Stanley, Staff-Serjeant Storey, Corporal T. Kerr, and Private W. J. Scorey, have been most

enthusiastic in trapping and preserving in captivity this insect, and in hunting for its ova and larvæ. Following Grassi's observations, we have collected the most varied materials—human and animal dejecta, earth and rubbish, stones from cellars, dust, cobwebs and mortar from walls, scrapings of ventilation pipes of sewers, water, slime and putrid matter from wells, cesspools and sewers, seaweed, decaying leaves, fragments of paper, straw, shavings from dark moist corners, the bark, fruit, leaves, and roots of trees, &c., &c.—and after submitting them to microscopical examination we have placed these substances in Petri dishes or gauze-covered bottles, where they have remained for weeks and months. Unfortunately, we have not yet succeeded in detecting the ova or larvæ in any of our samples, nor has the adult *P. papatasii* ever hatched out from larvæ which might have been hidden in the materials. Grassi admits that he has only rarely found the ova and larvæ in nature, "Non avendo potuto avere che un piccolissimo numero di larve."

We have endeavoured to entrap the fly in the open, by placing flat objects, such as tin plates, boards, &c., the surfaces of which have been covered with fresh paint, linseed oil, paraffin, or other greasy material, over drains, holes in walls, crannies in rocks, clefts in woodwork, fissures in the bark of trees, &c. Though many flies have been ensnared by the oily substance, *P. papatasii* has not been found among them. We have never discovered phlebotomus on the under surfaces of the air-tight covers of the inspection chambers of sewers. The harmless psychoda has been abundant in this situation. Phlebotomus has not been caught in chiffon-covered frames applied to the openings of the ventilation pipes of sewers, or to the seats of latrines.

By placing female *P. papatasii* on leaves in bottles, Major Crawford, Captain Anderson, Captain Marett and I have obtained a few larvæ hatched out of ova deposited on the leaves. They have never reached maturity, and survived for a few days only. This is not altogether surprising, since many diptera require special conditions for their development. Giles, in his work on mosquitoes, states that he has not yet succeeded in rearing anopheles from egg to imago. The Imperial Entomologist with the Government of India (Bulletin No. 7) used wet blotting-paper soaked with the decayed pulp of cucurbitaceous fruits for hatching the eggs of phlebotomus, but his larvæ soon died. He states that the larvæ have not been found in the field in India.

Grassi recently has been able to rear the phlebotomus from ovum to maturity. He allowed me to inspect the chamber in Rome

in which he had conducted the experiments which succeeded only after several years of failure. It was a dimly-lighted room, somewhat below the level of the street. The floor was damp and covered with fragments of stone, mortar, brick, &c., which retained a considerable amount of moisture. He gave me a piece of mortar, in a crevice of which a nymph-case can just be discerned with the unaided eye. On returning to Malta we redoubled our efforts in the search for similar vestiges in bits of stone from old walls, cellars, caverns, &c. Although we failed to verify our suspicion, it seems that crannies and crevices in walls or rocks are the places in which the *P. papatasii* selects to breed.

Doerr[1] has been equally disappointed in his search for the breeding places of phlebotomus in Mostar during the summer of 1909.

It was hoped that by following the life-history of a harmless member of the same family, *Psychoda phalænoides*, a key to the problem would be obtained. The larvæ of this psychoda are abundant in the slime of sewers, and of walls which are constantly wet. They develop rapidly to the imago stage in captivity, and a fresh generation can be reared under artificial conditions. These larvæ perish if they are allowed to dry, but complete submersion also kills them. Judging by analogy, the rudimentary stages of *Phlebotomus papatasii* cannot be passed in any but damp places. The phlebotomus larvæ we have reared were soft-bodied and unable to bear exsiccation. The habits of the two species are, however, distinct. *P. papatasii* are not found associated with the psychoda, so less was learnt than was anticipated.

The phlebotomus has thrived best in cages, the dimensions of which are 18 inches × 12 inches × 12 inches. The top and sides are covered with the finest chiffon; a sleeve of the same material is fixed at one end. Fragments of porous stone moistened with water, or wet blotting-paper on a plate, together with fruit of various sorts, are placed in the cage. The phlebotomi only rarely have been seen to feed on this vegetable matter, nor have they been attracted by raw lean meat. The cage must be kept in a sheltered spot. Exposure to the sun rapidly destroys the phlebotomi. Under the most favourable circumstances they have survived no longer than a fortnight. Many expire within a few days of capture, though still seen to be distended with blood. If an observer introduces his forearm into a cage containing twenty or thirty flies, it is

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[1] *Archiv f. Schiffs. und Tropen Hygiene*, XIII. 22, p. 694, November, 1909, and THE JOURNAL OF THE ROYAL ARMY MEDICAL CORPS, vol. xiv., p. 224.

only rarely that he finds more than one or two punctures have been inflicted on him, though he may continue the experiment for half an hour, and though the "sand-flies" may have had no food since their capture. It is therefore apparent that there is considerable difficulty in infecting phlebotomi, in preserving them for a week after infection, and in inducing those that survive to bite at the end of that period.

It had been proposed to carry out the experimental part of the investigation on monkeys which had been brought from England for this purpose, but they proved to be immune. Four cubic centimetres of virulent blood caused no symptoms. Neither had broth-cultures of virulent blood or filtrates through Chamberland candles any pathogenic effect on monkeys, rabbits, or guinea-pigs. It therefore was necessary to enlist volunteers for the research. Many willingly came forward and offered themselves.

Science and humanity owe a debt of gratitude to the self-sacrificing courage and zeal of the gunners of the 99th Company of Royal Garrison Artillery. When the object of the research was explained to them, they vied with one another in offering themselves as cheerful victims for the sake of mankind. The men of this company are of splendid physique, and they rejoice in rude health, which they maintain by the enthusiastic pursuit of athletics. Those volunteers who were selected for experiment had resided less than a year in the island. They were all exceptionally healthy, strong, and muscular men. The aches and pains during the acme of phlebotomus fever make the sufferer an object of our profound pity. Those who, of their own accord, knowingly submit to them, are martyrs indeed.

Experiments with Infected *Phlebotomi papatasii*.

Gunner Finn was admitted to the Military Hospital, Valletta, on June 12th, 1909, complaining of pain in the stomach, vomiting, and purging, which had come on suddenly that morning. His temperature was 102° F. (see Chart 4). His face was deeply flushed, and his eyes suffused in the manner characteristic of phlebotomus fever. His tongue was covered with thin white fur, except at the tip and edges; it was moist. He complained also of much headache and of pains in his back and in the calves of his legs. There was no rash, nor evidence of his having been bitten by insects. On the same evening he put his hand and forearm into a cage containing about fifteen *P. papatasii*, which had been caught in the Royal Army Medical Corps barrack-room,

Valletta. They eagerly attacked him. On withdrawing his forearm half an hour later there were marks of seven punctures, which rapidly became the centres of urticarial spots, a centimetre in diameter, accompanied with much itching. These disappeared in a few hours. Next day no trace of the bites could be found.

FEVER EXPERIMENTALLY INDUCED BY MEANS OF INFECTED PHLEBOTOMI PAPATASII.

FEVER CAUSED BY BITES OF INFECTED PHLEBOTOMUS PAPATASIUS.

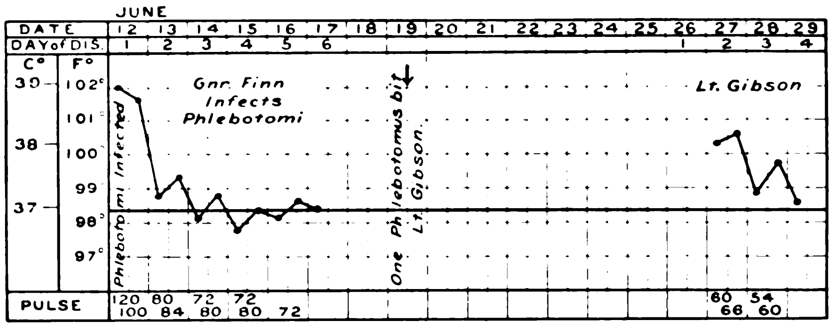

CHART 4.

FEVER CAUSED BY BITES OF INFECTED PHLEBOTOMI PAPATASII.

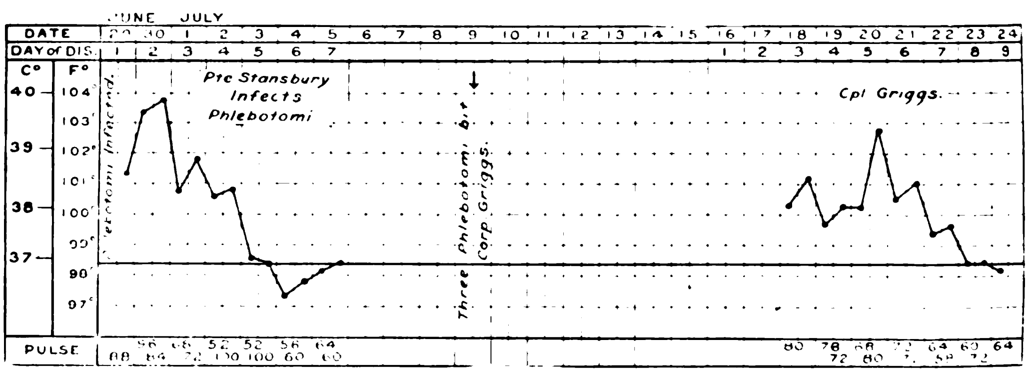

CHART 5.

The gastric symptoms soon ceased. His temperature fell to the normal on the second day, and his convalescence was rapid (see Chart 4).

Experiment 1.—Seven days later,[1] at 1 p.m., Lieutenant H. G.

[1] Since Doerr showed that phlebotomi were not immediately infective after sucking virulent blood.

Gibson, R.A.M.C., introduced his forearm into this cage and was bitten by one phlebotomus. A small, irritable papule was the result, which remained visible for forty-eight hours. On June 26, seven days after submitting to the bite, he began to feel unwell. Severe vomiting, repeated three times with much nausea, came on. Headache, pains in the back, lower extremities and abdomen caused him to pass an almost sleepless night. Movements in bed were attended with much discomfort. On the following day he had the typical look of "Pappaticifieber," deeply flushed face, and injected conjunctivæ. His tongue was coated with a thin white fur, his taste was impaired, and he had much nausea, giddiness, and anorexia. General stiffness of the muscles of the back and lower limbs continued. His temperature was raised to 100·2° F., but his pulse was slow. He was constipated. He was inclined to somnolence, and was obliged to lie quite quiet in bed on account of the discomfort attending movements of any kind, and of giddiness when he attempted to raise his head. His eyeballs were tender. On the following day most of his symptoms had disappeared, and his convalescence was unimpeded (*vide* Chart 4).

Private Stansbury was admitted on June 29th, 1909, complaining of severe frontal headache, discomfort in the eyes, lumbar and calf pains. He had been taken ill at 11 a.m. of that day. His face was much flushed, his conjunctivæ injected, his tongue was coated with a thin white fur, it was rather large, and moist. He was constipated. His temperature was 101·5 F. and his pulse 88. Ten hours after the onset of the fever he submitted to the bites of *P. papatasii* confined in a cage. Several sucked his blood, though they left no trace on the following morning. His febrile symptoms were still severe next day. The frontal headache, intolerance of light and muscle pains became more pronounced. He resented being disturbed, and lay with his eyes closed, attempting to sleep. His pulse was slow. Improvement began on the third day. On the fourth day his temperature was still raised over 100·5° F., though his pulse was only 50 to 60. There was a crisis on the morning of the fifth day, with rapid convalescence (see Chart 5).

Experiment 2.—On July 9th, 1909—that is, ten days after the sand-flies were infected—Corporal H. Griggs, R.A.M.C., put his arm into their cage and was thrice stung. Six days eight hours later he began to shiver and to suffer from severe headache, especially over his eyes; weakness and pains in his legs and back, anorexia, thirst and high fever. Next day he remained much the same, but weaker, and became faint when he attempted to stand up.

He was constipated, and had complete loss of appetite. On the morning of the third day he was unable to stand on account of weakness and giddiness, his temperature was 100·5 F., and his pulse 80, which was irregular. His face was flushed and his conjunctivæ injected. His tongue was large and flabby, and was coated with a pale, white fur, except at the tip. It was moist. There were no malarial or other parasites seen in films of his blood stained by Giemsa's fluid. His serum diluted ten times gave no reaction with the *Micrococcus melitensis* or *Bacillus typhosus*. His leucocytes were reduced in number—4,050 per c.mm. It will be seen on referring to Chart 5 that the pyrexia continued until the morning of the eighth day. There was no notable change in the character of his symptoms until they abated on the seventh day, when the stiffness of the muscles of his back and limbs and headache disappeared. He regained his usually robust health in a few days.

Experiments at the Royal Army Medical College, London, with Phlebotomi infected in Malta.

Patients while in the first day of typical attacks of phlebotomus fever introduced their forearms into a cage containing seventy or eighty *P. papatasii* on August 22nd, 23rd, and 24th. (*Vide* Charts 6, 7, 8). Some of the phlebotomi sucked blood on each occasion.

Lieutenant-Colonel J. J. Gerrard undertook to convey these flies to London by the quickest route. He left Malta on the night of August 24th, 1909, and delivered the cage to Sir W. B. Leishman on the afternoon of August 28th, when he arrived in London. Sir W. B. Leishman, Lieutenants H. S. Ranken and F. W. M. Cunningham, R.A.M.C., at once endeavoured to feed the flies, which were now reduced to eight or ten, with their blood.

Sir W. B. Leishman is in doubt whether they attacked him. He could find no trace of a puncture on his skin.

Experiment 3.—Lieutenant H. S. Ranken was twice bitten. Minute ecchymoses formed round the site of the stings. Five days later he felt cold and uncomfortable and complained of frontal and temporal headache. The feeling of chilliness continued for about an hour after going to bed. On the second day his malaise remained. He had diarrhœa, and passed three profuse watery evacuations. On the third day he still retained the feeling of weariness, and suffered from diarrhœa. Improvement began on the fourth day and he speedily regained his health. No pyrexia was noted throughout the attack.

CHARTS OF PATIENTS WHO INFECTED THE PHLEBOTOMI PAPATASII DESPATCHED TO ROYAL ARMY MEDICAL COLLEGE, LONDON.

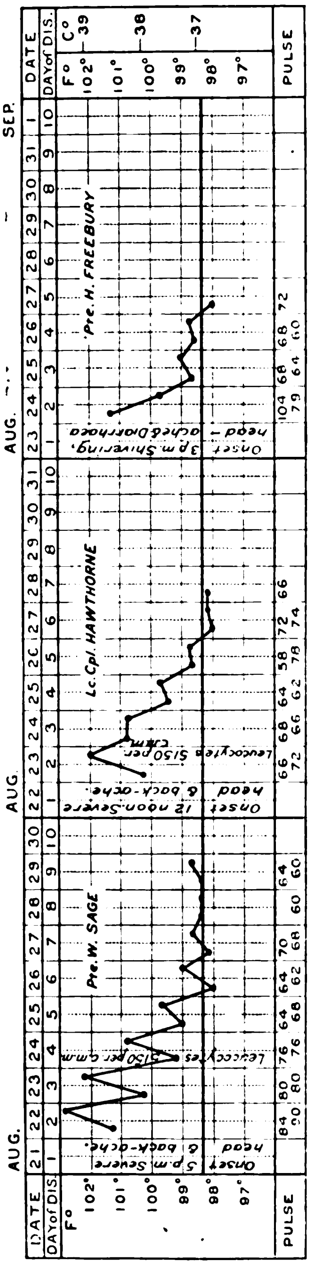

CHART 6. CHART 7. CHART 8.

Experiment 4.—Lieutenant F. W. M. Cunningham was bitten by one phlebotomus only. The small mark of the puncture disappeared in twenty-four hours. Five days after exposure to infection he began to suffer from slight headache, general malaise, feeling heavy and tired; diarrhœa set in. He had five actions of the bowels. On the second day he felt better, though the diarrhœa continued. On the third and fourth days he felt well. At 5.30 on the morning of fifth day he woke up with a slight degree of shivering, which passed off in a few seconds. A few minutes later it was repeated with greater severity, his teeth chattered and his head and shoulders trembled. His pulse was 90 and his skin was clammy. No thermometric observation was then made. He fell asleep again and woke up feeling quite well. Pyrexia was not noted at any time.

Franz, on p. 32 of Doerr's monograph, "Das Pappatacifieber" notes the occurrence of cases of phlebotomus fever in which the intestinal symptoms are pronounced, with little or no elevation of temperature: "Auffallend war, dass hauptsächlich jene Fälle, die mit reichlichen diarrhoischen Entleerungen einsetzten, wiederholt nur von geringen Temperaturerhöhungen begleitet waren; desgleichen ging die Entfieberung rascher vor sich, wenn wässerige Stühle auf der Höhe des Fiebers auftraten."

Later he says: "Ja es gibt Fälle, die zur Zeit der Epidemie einzelne Symptome des Pappatacifiebers aufwiesen, dabei jedoch gänzlich fieberfrei blieben."

It was mentioned previously that diarrhœa is a symptom of the ailment in about 20 per cent. of the attacks in Malta.

Experiments with Blood.

No. 8242 Private J. Matthews, 2nd Somerset Light Infantry, was attacked with head- and backache on the morning of August 13th, 1909. His temperature was raised to 101° F.; his face was flushed, his tongue was large, moist, and coated with a thin white fur. His bowels were confined. He had not previously suffered from any infectious disease. His leucocytes were somewhat reduced in number—5,900 per c.mm. The serum did not agglutinate the *M. melitensis*, or the typhoid bacillus. His blood proved sterile on culture in broth. His was considered to be a favourable case for providing blood for experimental purposes; 9 cc. were withdrawn from the median basilic vein eighteen hours after the onset of his illness. His febrile symptoms continued throughout the second

day, and some epigastric tenderness and pain was noticed by him. Nevertheless he made a rapid recovery. (See Chart 9.)

Experiment 5.—No. 3568 Gunner Thomas Carey, 99th Company, Royal Garrison Artillery, volunteered to receive Matthews' blood. Accordingly 1·5 cc. of the blood withdrawn from Private Matthews at 6.30 p.m., August 13th, 1909, were immediately injected beneath the skin of Carey's forearm. Three days sixteen hours later, on the morning of August 17th, he was seized with a feeling of chilliness, malaise, rapidly followed by severe headache and pains in the lumbar region. He was incapacitated from work and lay on his bed, constantly moving himself, trying to get relief from his aches. His temperature in the evening was 101·4° F. His face was deeply flushed and his eyes were injected and tender and sensitive to light. His tongue was moist, but was coated with a thin layer of white fur. He was constipated and had complete loss of appetite, and was very thirsty. There was no rash or traces of bites of insects. On the morning of the second day his fever was unabated, but his pulse was reduced to 50 per minute. His leucocytes were few—5,950 per c.mm. The polynuclears were diminished to 57 per cent., while the medium-sized mononuclear and transitionals were increased to 19 per cent. No malarial parasites were present. His temperature fell on the evening of the second day and he made an uninterrupted recovery. (See Chart 10.)

Experiment 6.—No. 27733 Gunner Albert Edward Bradley, of the same company, Royal Garrison Artillery, was also a willing volunteer; 2 cc. of the blood withdrawn from Matthews at 6.30 p.m., August 13th, were forthwith injected beneath the skin of Bradley's forearm. He remained quite well until the morning of August 18th, four days sixteen hours after inoculation, when he began to suffer from aching in his head, back, and limbs, which caused him to toss restlessly in his bed, whither he was compelled to go. He had nausea, and he vomited once in the evening. His temperature was raised above 103° F., though his pulse was below 90. He passed a restless night, troubled with the pains in his head, eyes, back, and knees. Next day his face was still flushed and his conjunctivæ were injected. His tongue was moist, but coated with white fur, except at the top and edges. He complained of much stiffness in his limbs. His leucocytes were reduced to 5,600. The polynuclears were diminished to less than 50 per cent.; the deficiency was supplied by an increase in the medium-sized mononuclears and transitionals. Improvement set in on the third day. The attack ended without complication or delayed convalescence. (*Vide* Chart 11.)

FEVER INDUCED BY MEANS OF FILTERED AND UNFILTERED BLOOD.

Charts 9 to 13.

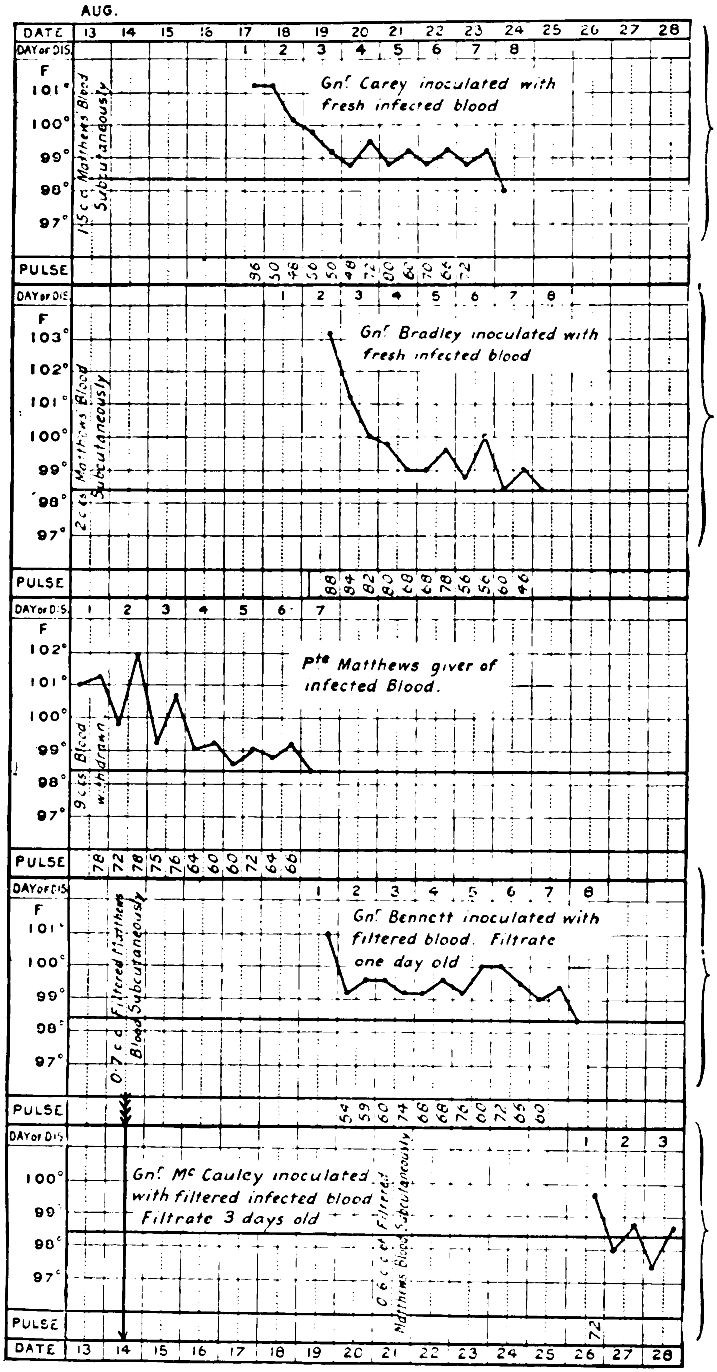

Chart 10. — No. 1.—Fever caused by inoculation with **Fresh** infected Blood.

Chart 11. — No. 2.—Fever caused by inoculation with **Fresh** infected Blood.

Chart 9.

Chart 12. — No. 3.—Fever caused by inoculation with **Filtered** infected Blood. Filtrate one day old.

Chart 13. — No. 4.—Fever caused by inoculation with **Filtered** infected Blood. Filtrate eight days old.

EXPERIMENTS WITH FILTERED BLOOD.

Experiment 7.—Five cubic centimetres of Matthews' blood extracted at 6.30 p.m., August 13th, were mixed before coagulation had taken place with 45 cc. of sterile physiological salt solution. This mixture, which remained permanently free from clot, was immediately placed in a Cobbett's filter which had been sterilised. This was fitted with a "Chamberland F. candle controllé." The apparatus had been proved to be reliable by testing it with *M. melitensis* emulsion, which was kept back. Filtration of the blood and salt solution was conducted under the pressure of gravity only at a temperature of 78° F. About 20 cc. of filtrate was collected in twenty-four hours; this filtrate proved to be sterile on culture on agar. After the completion of the process the filter was again tested wth the *M. melitensis*, and was found to be proof against this small micro-organism.

Seven cubic centimetres of this diluted filtered blood of Matthews, representing 0·7 cc. of fresh blood, were injected under the skin of the forearm of 28,086 Gunner Edwin George Bennett, 99th Company, Royal Garrison Artillery, who with great alacrity offered himself for experiment at 7.15 p.m. on August 14th, 1909. In the afternoon of August 19th, four days and twenty-one hours after inoculation with the filtered blood, he began to feel unwell. His head and back ached; his face became flushed, his eyes were suffused and the globes tender on gentle pressure. His temperature was raised to 101° F., but his pulse remained below 60. He passed a restless night on account of the discomfort in his head, eyes and back, though his fever was less next day. Loss of appetite and constipation were noted. His leucocytes amounted to 10,100, but there was a relative diminution in the polynuclears, which amounted to 61 per cent.; the medium-sized mononuclears were increased to 15 per cent. On the third day he felt much better. The improvement continued, but his temperature did not reach the normal morning level till the eighth day. Convalescence was rapid. (*Vide* Chart 12.)

Experiment 8.—Six cubic centimetres of the same filtrate, which had been preserved in the dark at a temperature of 75° F. to 80° F. for a week, were injected beneath the skin of the forearm of 27786 Gunner James McCauley, 99th Company, Royal Garrison Artillery, who, without solicitation, came to the laboratory requesting that he, too, might aid the investigation by submitting to inoculation. This corresponded to 0·6 cc. of undiluted blood. The injection was made at 7 p.m., August 21st. Four and a half days later, on the morning

of August 26th, he began to feel unwell, lost his appetite, and complained of headache. He was inclined to lie down all day. In the evening his temperature was 99·4° F. and his pulse 72. His tongue was slightly furred and he had a heavy appearance in his eyes. Next morning his symptoms had passed off; his evening temperature was 98·2° F., and he looked almost well. He rapidly recovered his usual good health. (See Chart 13.)

Private T. Gillespie, 2nd Somerset Regiment, was admitted to hospital on September 15th, 1909. He came from a regiment and barracks where numerous cases of phlebotomus fever had occurred. His forearms bore traces of phlebotomus bites; notwithstanding this, he attributed his illness with great confidence to exposure to the sun on the rifle range on the day of his admission. The theory that most of the febricular attacks in hot climates are due to the sun has held sway so long and tenaciously that it was considered advisable to put it to the test of experiment. The attack came on suddenly with pains in his head, back, and in the calves of his legs. He could walk only with difficulty, and his comrades noticed that he looked very ill. He bore the characteristic aspect of phlebotomus fever; hot, dry skin, temperature 103·2° F., pulse 72, flushed face, heavy half-open eyelids, conjunctivæ injected. He complained of a racking headache, chiefly confined to the forehead and eyes, which were sensitive to light, movements of the head, and gentle pressure. His tongue was large, moist, coated with a thin fur except at the tip and edges; his blood contained no parasites; the leucocytes were somewhat diminished, 6,500 per cubic millimetre. The polynuclears were decreased to 42 per cent., but the medium-sized mononuclears were increased to 22 per cent. Next day, though his fever was less, his symptoms were unabated; he vomited once, and was constipated. Twenty-three hours after the onset 9 cc. of blood were withdrawn from the median basilic vein; 3 cc. were injected immediately beneath the skin of the forearm of 28038 Gunner George Dyer, 99th Company, Royal Garrison Artillery; and 3 cc. were administered subcutaneously to 28884 Gunner Albert Meades, 99th Company, Royal Garrison Artillery; 3 cc. were inoculated into 200 of peptone broth. This remained sterile. Gillespie began to improve on the second day; his pulse was slow, 48 only, when his temperature was 102·6° F. His temperature fell on the third day; the pains in his head, back, and limbs were less, and his tongue began to lose its furred coating. On the fourth day he was almost well; his convalescence was unbroken. (See Chart 14.)

Experiment 9.—28884 Gunner Albert Meades, 99th Company,

Royal Garrison Artillery, voluntarily received 3 cc. of the blood of Gillespie beneath the skin of his forearm at 3.10 p.m. on September 16th, 1909, immediately after venesection had been performed. He was in excellent health and had never been ill. On the following

CHARTS 14, 15, 16.

Fever Induced by Inoculation with Fresh Blood.

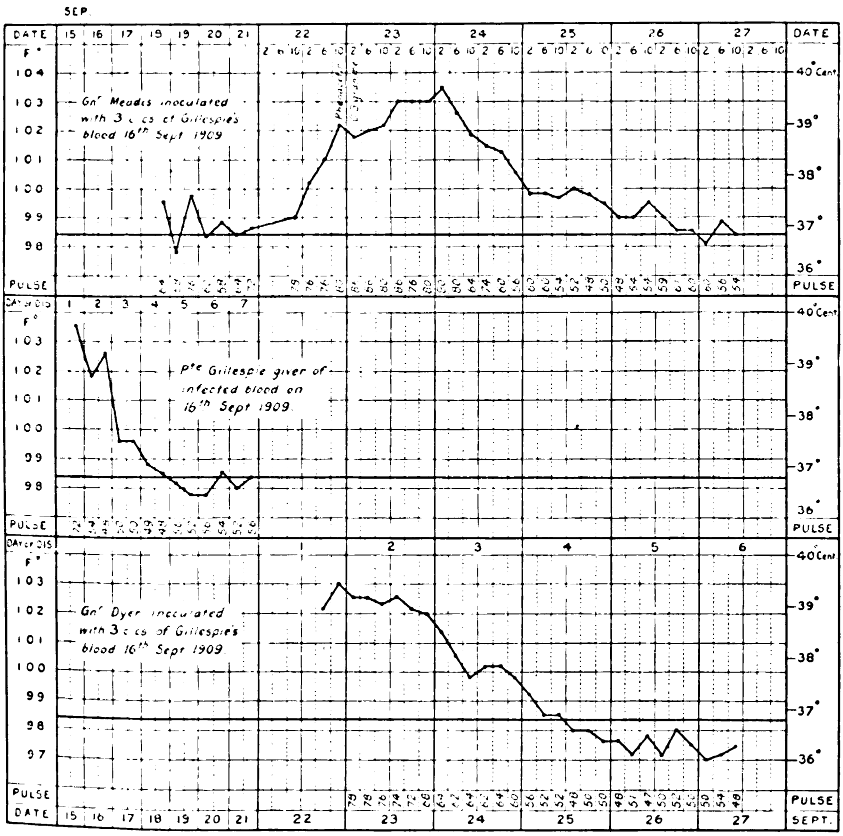

Chart 15.

Chart 14.

Chart 16.

evening he felt somewhat languid. Next day he had slight headache, some loss of appetite, and disinclination for exertion. His bowels were sluggish and his tongue was rough and furred in the centre. Purgatives gave some relief, but his ordinary vigour did not return. The morning of September 22nd, five and a half days after inoculation, marked the onset of a very severe attack of phlebotomus fever. Headache commenced, with pains in his arms,

legs, knees, and back, which continued with increasing severity. On the evening of that day his flushed face, half-closed palpebral apertures, suffused conjunctivæ, and look of distress were typical of the fever. One-third of a gramme of phenacetin was given to alleviate his headache, which had now become almost unbearable. On the second day of the attack the symptoms were unrelieved. He had much nausea, distaste for food, and he vomited once: his tongue was coated with a white creamy fur except at the tip and edges; he could hardly move in bed on account of the pain and stiffness in his body and limbs; his headache was intense; his eyes were sensitive to light and were tender on pressure; ocular movements were attended with discomfort; he was drowsy, but restless. Notwithstanding four degrees of fever his pulse remained below 80. His leucocytes were diminished to 4,125 per cubic millimetre. There was a diminution in the number of polynuclears and an increase in the medium-sized mononuclears. No malarial or other parasites were found in films stained by Giemsa. On the third day improvement began, though he was much harassed by the stiffness and pain on movement of his back and leg muscles. He slept the greater part of the day. On the fourth day his temperature had fallen below 100° F., and his symptoms were becoming less pronounced; his tongue remained dirty. He expressed himself as feeling nearly well on the fifth day. His convalescence was unbroken. (Chart 15.)

This case affords a good example of a prodromal stage which has been observed by Pick in "pappataci fever." A few examples of malaise and slight disorders of digestion preliminary to the onset of the pyrexia have been noted in this Malta epidemic.

Gunner Meades at no time exhibited any rash, nor marks of biting insects.

Experiment 10.—No. 28038 Gunner George Dyer, of the same company, was Meades' companion in offering himself for an experiment by which he might benefit his fellow-men; 3 cc. of Gillespie's blood immediately after withdrawal were injected subcutaneously into his forearm at 3.10 p.m. on September 16th, 1909. Dyer was in perfect condition and had always enjoyed robust health. He had not been bitten by phlebotomi. On the morning of September 22nd, five and a half days after inoculation, he complained of chilliness, headache, malaise, and distaste for food and impaired taste. The same evening his temperature rose to 102·4°F. The pains in his head, back, and calves of his legs were more marked. He passed a restless night. On the second day all his symptoms were aggra-

vated. His face was much flushed. His headache was worse, confined chiefly to the forehead and eyes, which he could hardly open. The general stiffness of the muscles in his trunk and limbs limited his movements in bed. His tongue was thickly coated with brownish white fur, except at the tip and edges. He had vesicles on the mucous membrane of his mouth and palate. His pulse was slow and rather irregular. His leucocytes were 8,575 per c.mm. There was a decrease in polynuclears and lymphocytes and an increase to 38 per cent. in the medium-sized mononuclears. There were no malarial or other parasites evident in blood-films. Though his seizure was not quite so acute as Meades', he bore the aspect of suffering great distress during the height of the fever. On the third day the intensity of his symptoms was becoming subdued and he spent many hours in sleep. His mouth and tongue were still abnormal. The fever subsided on the fourth day. (Chart 16.) A leucocyte count gave 5,970 per c.mm. On the fifth day he had nearly recovered his usual health, but his pulse was still slow and irregular. No rash was observed. He rapidly regained his vigour.

All those gunners who volunteered for experimental inoculation were quartered in St. Elmo Fort, where we were unable to discover any *P. papatasii*. Although about 350 was the number of troops occupying this fort, only three cases of phlebotomus fever had occurred among them. Moreover, nearly two months had elapsed since the date of the last admission, at the time of the experiments. No vestige of a midge-bite was detected on any of these soldiers just mentioned. By these means it has been proved—

(1) That the blood of a person suffering from phlebotomus fever is virulent during the first day;

(2) That the virus can pass through a Pasteur Chamberland candle "F";

(3) That the *P. papatasii* can convey the infection;

(4) That the incubation period has varied from three days sixteen hours to seven days;

(5) That *P. papatasii* are infective seven to ten days after sucking virulent blood[1];

(6) That the virus retains its activity for a week *in vitro*.

The phlebotomus fever of Malta and Crete is a milder ailment than that of Herzegovina described in R. Doerr's classical mono-

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[1] Negative results were obtained with flies which had been infected under a week. It was seldom that they survived longer than ten days in captivity. Experiments with survivors were also unsuccessful.

graph, "Das Pappatacifieber," 1909. The clinical symptoms are much the same, but in the Malta infection they are not so accentuated. Doerr observed that convalescence might be protracted for weeks on account of mental depression, weariness, irregularity of the bowels, tendency to faint, &c., hence the name of the disease in the slang of the barrack room was "Hundskrankheit." Franz recognises, however. that epidemics on the Dalmatian coast vary considerably. In some, nervous symptoms, delirium and hyperpyrexia are frequent; in others, gastro-intestinal derangements predominate; in others again, pains in the muscles and along the nerves are marked features.

As in Malta, the fever is prevalent in Herzegovina during the summer months only, after the *P. papatasii* has made its appearance. Newcomers are attacked. Individual barrack-rooms are singled out, just as in this island.

Phlebotomus fever is an infection distinct from dengue, which, too, is caused by an invisible virus conveyed by the culex. Dengue has well-marked clinical signs in the rashes and joint pains, which are of a much severer description than the aches of phlebotomus fever. Moreover, dengue has occasionally visited Malta. In the autumn and winter of 1881 it was epidemic. But there is no record of an outbreak during the summer.

Ophthalmo and skin reactions with the virulent blood of phlebotomus fever gave negative results. Mixtures of serum of patients in the course of the fever with that of convalescents resulted in no precipitation. So far, therefore, no specific test for diagnosing the infection has been discovered, except human inoculation.

R. Doerr's researches on "Pappatacifieber," in Dalmatia and Herzegovina, instigated similar investigations on the cause and nature of the kindred febrile ailments in the British Mediterranean possessions. The experiments which have been described above confirm in every respect Doerr's results.[1]

[1] "Das Pappatacifieber," p. 101.

MEDICAL HISTORY OF THE SOUTH AFRICAN WAR.

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C.—ASSOCIATED CONDITIONS.

THE spread of epidemic disease in the field, as elsewhere, is influenced in varying degrees by two sets of conditions, one general or common, the other local and particular to each outbreak. Those common to both these bodies of men can apparently only include :—

(i.) Climatic conditions, especially rainfall, temperature, dust.

(ii.) Water supply.

(iii.) The vicissitudes of war :—

(*a*) Those not directly related to infectivity ; fatigue, exposure, privation, moral conditions.

(*b*) Those directly related to infectivity.

(iv.) The mean incubation periods of enteric fever and dysentery in the infected individuals.

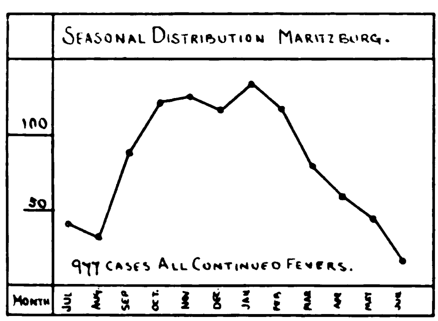

FIG. 6.

(i.) *Climatic Conditions.*—The seasonal variations in the prevalence of enteric fever in Natal in relation to climate have already been referred to. Unfortunately for purposes of comparison, no record is available of the normal prevalence of continued fevers week by week, but fig. 6 shows the monthly distribution of 977 cases of continued fever (simple continued fever and enteric) in Maritzburg between 1891-97 on a total mean strength of 10,475 men. One sees from this, that in both forces in Natal during this period of the war, the outbreaks occurred during the period of normal maximum prevalence, and further, which is also important, that during the first six weeks, the actual prevalence in either body

was less than the recorded prevalence in a body of much less strength during peace. Here we are, of course, comparing only one season with the aggregate of eight seasons in which the high prevalence in September, October, and November, is largely due to an exceptional prevalence during these months in the year 1897, and to a less extent in 1891.[1] But even allowing for this, the prevalence during the first six weeks of the period in each case was certainly not greater, and was in fact probably less than might have been expected on the same strength under normal conditions in Natal, if the conditions had remained the same as in the previous eight years. The risk of infection was probably less in the field army at the outset than in Maritzburg, but the same cannot be said of Ladysmith, where enteric fever had been very prevalent in the preceding hot season. One can only conclude that the duration of exposure to infection has some influence, that in fact the infection of the *units* of the force is an important condition.

There is a good deal of evidence which suggests that under ordinary conditions, the climatic influence in Natal, as elsewhere, is mainly exercised through the water supply, and possibly also by means of dust. Neither of these factors was negligible in either force; in Ladysmith certainly, pollution of the water supply by the the drainage of the rainfall must have been an important element from the very first, and along with it, food pollution from infected dust. The water influence in the field army is more uncertain ; less definite evidence is available regarding actual or potential pollution; dust infection was probably more intermittent than in Ladysmith, from the varying environment of the troops. From both these groups, however, one certainly gets the impression that the aggregate of conditions conveniently termed "climatic" was of much less importance than under normal conditions, and that their effects were, in fact, almost obliterated by other influences.

(ii.) *Water Supplies.*—As regards Ladysmith, the evidence of infection, short of the discovery of the *Bacillus typhosus*, may be taken to be conclusive. Here we had a previous infection through two seasons of a large part of the area drained by the Klip River, and evidence of sewage contamination of the supply. All South African streams are liable to great variations in volume, especially as between the cold and the hot season, and the accumulation of *débris* and filth of all sorts on the "dry season bank" is swept into the stream with the first floods. Hence in addition to a persistent

[1] *Vide* Army Medical Department Report, 1898, p. 518.

but varying degree of contamination by subsoil water from a polluted area throughout the greater part of the year, there is with the first heavy rains a sudden and considerable increase in the organic impurity. These considerations apply as forcibly to the sources of supply of the Field Army as to the Klip River, but with this difference, which may be important, that the actual degree to which these sources were infected must remain a matter of doubt. It is a bold hypothesis to advance that all the streams in the area of operations were infected, and probably unnecessary, and evidence of the possibility can only be put in general terms. The first proposition is that enteric fever is endemic in Natal, both among Europeans and natives, to an unknown extent, though the general prevalence may possibly not be very great. Durban and Maritzburg were both important foci of distribution. Epidemics also occur among the natives in their own kraals.

Secondly, before the war, attention had been called by medical men throughout South Africa to the dissemination of enteric fever by natives returning from the mines to their own homes, often in an advanced stage of the disease. This dissemination took place largely along the main lines of traffic, but also along the Kaffir paths which seam the veldt, and the river-bank is the natural place for the native to relieve himself when it is convenient. This comparatively common infection of the natives is also important in relation to the probability of the presence of "carriers" among the native followers of the army, recruited in the Colony.

Thirdly, in the early months of 1899, enteric fever had been generally prevalent in Natal, considerable outbreaks had occurred in Maritzburg and Ladysmith, and a small number of cases are recorded from camps at Nottingham Road and Mooi River, through both of which the troops of the field army passed to Estcourt, Frere and Chieveley, the main points of concentration.

This forms a mass of presumptive evidence which can hardly be neglected as showing the possibility of at least a local infection of the water supplies for the field army. On the other hand, as regards infection by the troops, the railway and main road northwards from Maritzburg to Ladysmith cross the river valleys nearly at a right angle, hence bodies of men proceeding along the main lines had but limited opportunities of infecting or being infected by a stream. Apart from the fouling of the dry bank, a variable quantity, and the adjacent ground, the water actually infected was carried away from the line of advance of the troops. When the troops turned westward after Colenso, the conditions were different in this respect.

Such were the historical and geographical features relating to the water supply of the field army. Whether these supplies were in fact infected or not is a matter of opinion, not of evidence. But we have at least evidence of the general possibility, or even probability, of infection, and the tendency to look on local infections as probable rather than possible will be the greater, the better one is acquainted with the actual details of warlike operations under such conditions as obtained in South Africa, where in addition to the Irregular Forces, impatient of discipline and sanitary control, there was a large native establishment devoid of elementary ideas of decency, and to whom sanitation, even of the simplest type, appears a wild dream.

The means of purification in Ladysmith have already been referred to. Apart from the condensing plant, which afforded a partial supply, the only successful installation appears to have been in the hospital at Intombi, where it was in the charge of Serjeant-Major (now Honorary Major and Quartermaster) F. Bruce, R.A.M.C. Here water was obtained by sinking barrels near the bank of the river; this was clear enough to pass through Berkefeld filters which had been obtained from the soda water factories in Ladysmith. The daily yield was about 1,500 gallons.

As regards the field army, "Berkefeld filters were to have been supplied to units in the proportion of one per company, but very few battalions had their full complement, and it is doubtful how far those supplied were satisfactory."[2]

The importance of an actual infection of the water supply, supposing it to have existed, is a problem of great difficulty, and little likely to receive a satisfactory solution. Materials do not exist, and cannot possibly exist, to enable one to assign due weight to each of the possible influences determining the actual incidence of disease.

(iii.) *The Vicissitudes of War.* (*a*) *Those not directly related to Infectivity.* — Fatigue, exposure and privation are influences secondary to the actual infection, if one limits the term infection to the actual entrance of the agent into the body. Yet all history shows their importance, possibly most usually recognised in relation to dysentery, a well-known accompaniment of famine and extreme poverty as well as of war in all climates. One has also experimental evidence of the effect of overwork (alone or with starvation) in accelerating the wanderings of *B. coli* from the intestine to

[2] "Report on the Campaign in Natal," by Sir T. J. Gallwey, K.C.M.G., C.B.

other organs.[3] The effects of these conditions are indeed so well known that it would hardly appear necessary to refer to them but for the fact that their influence has often been overlooked in the discussion of the prevalence of disease in South Africa.

As between the garrison of Ladysmith and the Natal Field Force there were important distinctions in this respect. The field force was well fed, "the troops always received full rations and frequently fresh bread and meat. After a period of specially arduous service, an endeavour was always made while the troops were resting to issue fresh bread and meat and vegetables, such as onions. The benefit to the men who had been living for days on "bully" beef and biscuit was noteworthy.[4]

In Ladysmith, conditions were otherwise. On November 2nd, when the siege began, there were reserve stores for a force of about 15,600 men of all classes (European and natives), as follows :—

Bread-stuffs, sixty-five days; meat, fifty days; groceries, forty-six days. To this was added all food-stuffs available in Ladysmith, which were requisitioned for general distribution. On the other hand, the civil population, who had to be provided for, brought the total numbers to about 21,000.

The siege actually lasted till March 1st, that is, one hundred and twenty days, while as the date of relief became more problematical, arrangements were made "to reserve a certain amount of food sufficient to maintain existence in the garrison till the latest moment possible. After careful consideration, this date was fixed to be March 31st, and by the aid of horse-flesh and chevril, and a gradually diminishing ration of mealie flour and groceries, a scale was prepared which would have enabled us to hold out until that date."[5] Towards the end of the siege the men were reduced in strength, "they had none of the things that were really necessaries; they had no vegetables, and things of that sort, and no butcher's meat practically. They were really living on mealie flour and various expedients made out of horses."[6] The "expedients made out of horses" were :—[7]

(1) "Chevril," a strong meat soup which was issued nightly to the troops and hospitals.

(2) A condensed form of chevril, which took the place of the

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[3] Ficker, *Archiv. für Hygiene*, lvii., f. 1, p. 58.

[4] Sir T. J. Gallwey's Report.

[5] Sir Edward Ward, K.C.B., App. 37, Report of Royal War Commission.

[6] Sir Edward Ward, No. 5,745, vol. i., Report of Royal War Commission.

[7] Appendix 37, Report of Royal War Commission.

ordinary meat extracts, and was of such strength that one part of the extract made upwards of 30 parts of "beef-tea."

(3) "Chevril paste," which was made of the boiled meat and jelly, was issued as a ration at the rate of 1 oz. per man : this was much appreciated, especially by the convalescents. A "special potted meat," made from horse tongues, was manufactured exclusively for hospital use.

(4) A jelly similar to calf's foot jelly, which was used for the enteric patients.

(5) The boiled meat was issued as an extra to the meat ration of the troops, and also to the convalescents, at the rate of ½ lb. per man. (The nutritive value of some of these preparations is probably very low.)

Mealie meal was mixed with flour so that it might be baked, and also to make it more palatable, till the flour gave out, when some biscuit was also issued. Mealie meal is of course an excellent food-stuff, but the quantity was small.

The garrison was placed on reduced rations, and the scale descended to the following minimum about the time of the relief :—

Fresh horse meat	1 lb.
Cooked meat	½ lb.
Mealie meal	3 ozs.
Biscuit	¼ lb.
Tea or coffee	$\frac{1}{6}$ oz.
Sugar	1 ,,
Salt	½ ,,
Pepper..	$\frac{1}{64}$,,
Mustard	$\frac{1}{20}$,,
Vinegar	$\frac{1}{10}$,,
One horse sausage ration	
Chevril (for dilution)	⅓ pint.

Attention may be called to the relatively large proportion of nitrogenous constituents. A similar condition obtained on the march to Bloemfontein, and indeed to some extent throughout the whole campaign, at least in the later stages, where though the bread and grocery rations were not in any way deficient, the meat was often in excess of the normal ration. In Ladysmith the want of vegetables, especially in the absence of fresh meat, was a serious deficiency, only partly obviated by the small issue of vinegar, of which a supply had been found in the town.

But whatever effect this food factor had on the maintenance of a high incidence of enteric fever and dysentery in Ladysmith, it apparently had but little effect on the development of the out-

breaks (fig. 2); for throughout November, when many of the cases of enteric fever admitted to hospital in the first half of December must have been infected, the condition in Ladysmith was one of precaution, of guarded issue; the stage of actual privation had not then commenced. There is, indeed, no evidence of any close connection between the degree of privation and the intensity of the epidemic: we find the admissions falling when the food conditions were getting worse. One has again to remember that this decline in the admissions for continued fevers in the later stages of the siege may be due to the fact that the individuals who had not been infected were steadily and rapidly diminishing in number—that is; the susceptible population was actually and relatively becoming smaller. Besides this, it might be expected that other and more potent influences, true infective agencies, would mask the effects of such influence as the food supply might have had.

But if we turn to the admissions for bowel complaints (fig. 3), and if we consider diarrhœa separately from the others, we find a marked increase during the last five weeks of the siege, that is, during the period when not only were the actual conditions worse, but the results of previous privations were beginning to show themselves in a greater reaction of the bowel under infection. No doubt some of these cases of diarrhœa were in fact relapse cases of dysentery contracted at an earlier period of the siege, and their occurrence was determined by the gradual deterioration of the food supplies. Dysentery shows a considerable increase during the last two weeks of the siege. Here probably the question of lessened susceptibility through previous attack need not be considered; there appears to be no evidence of any degree of immunity as a result of an attack of bacillary dysentery, the prevalent, indeed the sole form occurring in South Africa.[8]

The inference that the greater prevalence of diarrhœa in the last stage of the siege may have been associated with the nature of the available food appears to be justifiable;[9] beyond this, no definite conclusions are possible beyond the general statement of the probability that the intensity of the outbreaks of both groups of diseases depended in some unknown degree on the unavoidable malnutrition of the individuals exposed to infection.

Turning now to the field army, where the food conditions were practically constant throughout the period, though for a few days

[8] Sir D. Bruce, F.R.S., Report of Commission on Dysentery and Enteric Fever.
[9] But see later under Field Army.

at a time some differences may have occurred, one finds that the variations in the intensity of the outbreak, both of continued fevers and bowel complaints, did not differ greatly from those in Ladysmith. We find the same general outline in the curve for continued fevers, the same rise in that for bowel complaints in February, with the difference that here the increase was due to dysentery, and not, as in Ladysmith, to diarrhœa. Further, in the field army, the curve for bowel complaints tends more to the maintenance of a general level, and not to the formation of a definite maximum incidence as in Ladysmith; here the difference in distribution between the bowel complaints and the fevers is distinct, while in Ladysmith both exhibit the same general features. The outstanding distinction is, of course, in the magnitude of the outbreaks; the well-fed force was attacked to a much smaller extent, but the food factor is only one of many: one can hardly believe that the field army was exposed to an infection of anything like the same intensity as that prevailing in Ladysmith, so that again, no conclusion as to the influence of the ration can be drawn. The increase in bowel complaints, after a fall in the beginning of February, was synchronous in the field army and the garrison of Ladysmith, which, as the field ration was approximately constant in the one, and diminishing in the other, suggests that perhaps the increase in Ladysmith at this time may not have been the result of the deterioration of the ration.

In neither case is there any very strong evidence of any connection of the food supply with the prevalence of disease.

As to fatigue and exposure, there was probably little difference in the degree to which both groups were subjected to these influences, nor is it possible to trace any particular relationship between periods of special stress and of increased sickness, especially as these two elements are so intimately connected with another and very important factor, the mental state of the troops in each group. The depressing influences of a siege are well known. At least one of the garrison at Ladysmith felt the monotony of the siege to be its worst feature, a complaint that would not at first sight appear to be at all probable in view of the uncertainty of the position. Sir Edward Ward, in his evidence before the Royal Commission said, on this point, "We noticed as General Buller's force approached us the sick-rate went down, as they retired it went up again."[10] This could, of course, only influence the date on

[10] Report of Royal War Commission, vol. i., No. 5,750.

ınfected with enteric fever or dysentery reported sick and in this way might have some small influence y numbers admitted.

leed, important to note how men will stay out of ıng as they are at all able to do any duty, provided that ething going on, something to interest them, but it is s of failure and depression that they feel the weight of is persistence at duty during the early stage of disease n in the number of men sent back to Bloemfontein fever within the first few days after Lord Roberts vance to Pretoria. It has, of course, a most important the spread of the infection. The field army, on the was less exposed to the depressing influences. No too, had their periods of relative depression, but their ; that of a free agent; they had a definite goal to he pursuit of any object, however difficult, is always ıting, possibly because of its difficulty, than the resolute against odds of a position already reached. On the ure could be but temporary, on the other irretrievable. possible to estimate the effect of these conditions, all ends to induce the belief that their effect would be le towards an increased susceptibility to infection, but ıeasure of their aggregate effect.

directly related to Infectivity.—Local densities of hat is, such an aggregation as occurs in tents, shelters, l the like, on the one hand, and the crowding together bivouacs, for for protection from the weather or the of itself involves association with infected individuals, n and exchange of blankets and clothing, possibly also involves a less direct association through the use latrines, through unavoidable proximity between living trenches, &c.), and latrines in use, through the almost iling of the ground outside the latrines by excreta or ıe cases are few in which this fouling of the soil was he vicinity of the latrines, and did not trespass on the This is not the place to discuss whether or how far ons are unavoidable: one has to accept the historical examine the results.

s quite evident that in these two bodies of men, the these local conditions must have been greater on the garrison. In the first place, the area was largely, if not cted from the first; it was in continuous occupation;

and lastly, was comparatively limited in extent. Any limited area of a line of defence of which the importance necessitates its constant occupation, in conjunction with a system of reliefs, becomes a focus of infection for a large proportion of the depending force. Hence even supposing that the infected area is at first small, the ultimate result will be a widespread infection, first of the troops providing reliefs for this area, and later, through them, of the rest of the garrison, and the whole area. Such conditions obtained in Ladysmith, leading to the extreme prevalence which was observed during the siege.

Similar conditions were operative in the field army, but to a more limited extent. Here the troops were not confined to a limited area, but, on the other hand, were moving over comparatively fresh ground, that is, ground which may have been, and probably was, in parts infected, but which was certainly much less so than that occupied by the garrison of Ladysmith. The conditions under which excreta were disposed of were also less calculated to spread disease, in that for the greater part of the period under review the troops were in constant movement, and their exposure to any definite focus of infection was limited in duration as they moved away from it.

(iv.) *The Mean Incubation Periods of Enteric Fever and Dysentery.*—These are variable and difficult to determine in practice. Curschman gives, "according to my experience—from one to two or three weeks," for enteric fever; the Clinical Society, "eight to fourteen days, sometimes twenty-three." These data relate to the occurrence in Europe. Martin[11] points out that the information regarding the incubation period in the Tropics is even less definite than that relating to European cases, and suggests that the *amount and virulence* of the infection has some considerable influence on the period. In Natal, such evidence as was available pointed to a period of about ten days. The incubation period of bacillary dysentery is shorter. Rüge gives two to eight days; this is longer than the period given by others. Strong and Musgrave give only forty-eight hours; in an experimental infection of man effected by these authors, the period was but twenty-four hours. Lentz allows two to three days.

The important point is that whatever limits may be selected, the incubation period of dysentery is considerably shorter than that of enteric fever, and that the harvest of cases following infection from

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[11] Mense, "Handbuch der Tropenkrankheiten."

a focus appears earlier and develops more rapidly. This is shown in the earlier development of the prevalence in the groups under consideration.

D.

One may now compare these two outbreaks in some detail, and this leads to the following conclusions :—

(1) The prevalence in Ladysmith was (except in the case of all bowel complaints) absolutely greater than in the Army in Southern Natal, and much greater relatively to strength, as is shown by the following table, in which the approximate ratios per thousand of strength are compared for the first fifteen weeks of the outbreak in each case, all that the figures permit. These have not been converted into annual ratios.

Group	Admissions	Approximate ratio per 1,000
	Continued Fevers.	
Ladysmith	1,242	98
S. Natal	1,095	47
	Dysentery.	
Ladysmith	1,277	100
S. Natal	1,302	56
	All Bowel Complaints.	
Ladysmith	1,381	109
S. Natal	1,969	85

As has been pointed out before, the Ladysmith rates are probably underestimated, while those in Southern Natal are probably too great. It will be noticed that bowel complaints other than dysentery accounted for only 9 per 1,000 in Ladysmith, but for 29 per 1,000 in Southern Natal. The term "S. Natal" includes little beyond the field army.

(2) The general features of each outbreak are similar.

One should compare only the first fifteen weeks in each case, as after the relief the differentiation between the two groups becomes impossible.

In each body of men we find a much earlier outbreak and a more rapid development of bowel complaints than of fevers. The rapidity of development is indeed more marked in the field army, but on the other hand, having reached a certain degree of prevalence, the curve shows a series of oscillations above and below a mean, from which it does not widely depart till the last week of the period. In Ladysmith, on the other hand, we find a steady development to a maximum, followed by a very material fall, and again by a rapid and almost continuous rise to a second maximum.

(3) Dysentery and diarrhœa.

These constitute practically the whole of the cases returned as bowel complaints. In addition, forty-two cases of inflammation of the intestines were recorded in Ladysmith, and eight in the field army; these are included in the totals.

In each group dysentery was more prominent during the earlier weeks, diarrhœa became relatively more frequent as time went on. This is especially the case in Ladysmith, where dysentery practically accounts for the whole of the bowel complaints up to the middle of January, and it was indeed about this time that diarrhœa became more important in the field army also. How much reliance is to be placed on the distinction between diarrhœa and dysentery it is impossible to say. It is probable that a proportion of the total cases of diarrhœa were the sequelæ of antecedent dysentery, that in fact, one and the same individual probably figured among the dysentery cases first and the diarrhœa cases later; the converse probably also happened. But on the whole, the cases of bowel complaint which preceded in time those of fever tended to be diagnosed dysentery and not diarrhœa. In Ladysmith, indeed, up to the end of January, diarrhœa was extraordinarily rare. The recorded cases of diarrhœa do not of course represent all that actually occurred, but only those of sufficient severity to be admitted to hospital, and in Ladysmith hospital accommodation was limited.

Dysentery, of course, differs from enteric fever in that it is a recurrent and chronic disease, and the bare statistics afford no measure of the proportion of fresh attacks among the cases admitted to hospital. When, as in Ladysmith, so large a proportion of the population had been exposed to previous infection in India (setting aside the smaller possibility of the Natal troops having been similarly exposed to a less virulent infection), we should expect under normal peace conditions in Natal to have a certain number of admissions to hospital on account of previously contracted disease. Hence the admission curve for dysentery represents a condition differing from that shown in the admission curve for enteric fever, a combination of fresh and chronic cases as against fresh cases alone. Further, the relapse in chronic dysentery is more determined by climatic influences and by diet than is the infection of enteric fever.

(4) Coincidence in time between disease prevalence in the two groups.

The only striking features are the fall in fevers towards the end of February, and the rise in bowel complaints about the same time. There is a curious similarity between the two curves

for bowel complaints from the beginning of February onwards, and the coincidence of a rise in bowel complaints with a fall in fevers in both bodies of men is interesting. There was, of course, a great increase in the fevers (especially in those recorded as enteric fever) in the field army after the relief, but it is not now possible to extract materials to continue this enquiry after that date. It may, however, be the case that this increase in the bowel complaints was preliminary to the increase in the continued fevers in the middle of March, an increase which was less marked in the garrison of Ladysmith because of the small proportion of men left unattacked, in whom a diarrhœa may possibly have been the sole reaction after a typhoid infection. That there were variations in infectivity in Ladysmith is seen from the shape of the curves.

It is, however, hardly legitimate to draw any conclusions from the rough, unadjusted curves, and it is possible that all the variations may be without significance, either in one curve taken alone, or still more in the comparison of the two.

NOTES ON MILITARY MAP READING.

By Major A. P. BLENKINSOP.
Royal Army Medical Corps.

(*Continued from p.* 49., vol. xiv.)

True and Magnetic North.

It is perhaps hardly necessary to state that the needle of the compass does not point to the "true" but to the "magnetic" north. The meridian or true north line never changes its direction; but the magnetic north varies with the variations of the compass. The deviation of the magnetic north line from the true north line is known as the *magnetic variation.* The amount of this variation is expressed by the degree of the angle formed by the intersection of these two lines at the centre of the compass, and is said to be either east or west according as the compass needle points either to the east or west of true north. On all military maps and sketches the true and magnetic north are shown as in the accompanying conventional sign (fig. 9), which indicates a magnetic variation of 15° W.

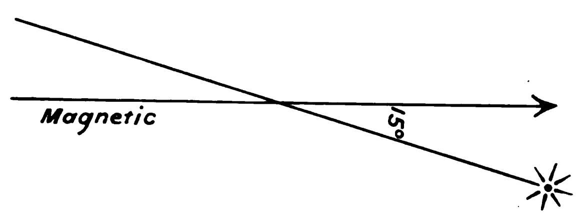


Fig. 9.

"The variation is subject to two principal changes, annual and positional."

"*Annual Change.*—In London the variation was 11° E. in 1576. It then gradually decreased until in 1660 the magnetic needle pointed to *true* north. The needle continued to move westward until in 1814 it reached its greatest westerly deviation (24° 30′ W.). Since 1814 the needle has been moving eastward, and the variation has been decreasing at the rate of some 7′ annually." In 1906 it was about 15° W. in London and 18° W. in the west and north of England.

"*Positional Change.*—The variation also changes according to

the position on the earth's surface. In northern India the variation is about 2° E., while in the extreme south the needle points nearly due north. In South Africa there is a variation of about 25° W., and in France and Germany from 10° to 15° W."

In addition to these changes, the compass may be affected by *local magnetic attraction*, due to the deflection of the needle by masses of magnetic iron ore or of iron. In parts of South Africa, and in some other countries where there are large deposits of iron ore, the attraction is so strong that a compass is useless. In England the error from this cause would seldom be more than 2°.

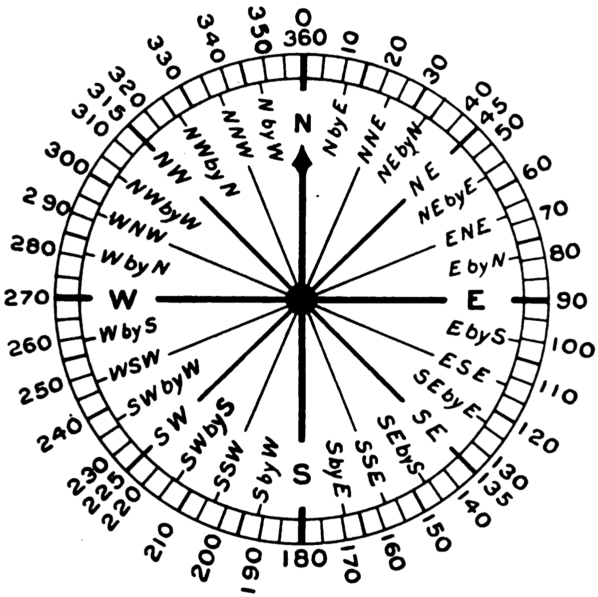


FIG. 10.

However, one should be careful not to make compass observations in too close proximity to an iron gate, railway line, &c., or the results may be misleading.

Different compasses may vary in their readings as much as two or three degrees. This is due either to the dial not being accurately fitted over the needle, or to the dial not being properly centred on the pivot.

It is hardly necessary in these notes to describe the prismatic compass as Royal Army Medical Corps officers usually do not carry this instrument on manœuvres or field service, nor are they called

upon to prepare field sketches. However, fig. 10 is introduced to show the various points of the compass and the corresponding magnetic bearings in degrees.

It will be observed that there are thirty-two points corresponding to the 360 degrees of the circle. Each point is therefore $11\frac{1}{4}°$ from the next one. Having committed the sequence of these points to memory, and bearing in mind that the degrees are numbered from left to right, like the figures of a watch, commencing at the north point, one may readily convert a true direction to a magnetic bearing.

For instance, if an order is given to advance west-north-west (true), and it is known that the local magnetic variation is 16° W., west-north-west by the compass is two points north of west (270°). $270° + 11\frac{1}{4}° + 11\frac{1}{4}° = 292\frac{1}{2}°$. Add 16° to allow for the westerly variation, and the result, $308\frac{1}{2}°$, will give the magnetic bearing of the line of advance; that is to say, a direction of approximately a point and a half north of west-north-west as shown by the compass.

Bearings.—True bearing is the angle a line makes with the true north line.

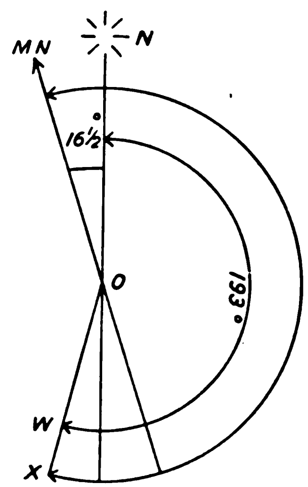


FIG. 11.

Magnetic bearing is the angle a line makes with the magnetic north line.

In each case the angle is measured from north by east and south, *i.e.*, in the same direction as the hands of a watch move.

To Convert True to Magnetic Bearings and vice versâ.—This

may be done by adding or subtracting the variation as may be required. Fig. 11 illustrates graphically the necessary calculation, and explains how the student may confirm his result.

The true bearing of an object is 193°; what is the magnetic bearing? Draw both north points and mark them as in fig. 11, inserting the value of the variation, which is here taken as 16½° W. Place the pencil on the *true* north line, and working east and using O as the centre, draw an arc round until 193° is described at W. Mark this arc 193°, and from the centre O draw a line to W. Prolong O W to X. Then from the centre O describe an arc, working east from the *magnetic* north line to X. It is obvious that the arc drawn from the magnetic north line will be 16½° greater than that drawn from the true north line. But the arc from the true north line = 193°. Therefore that from the magnetic north line is 193° + 16½° or 209½°; which is the magnetic bearing acquired. The following are the rules for the conversion of bearings:—

A.—When the Variation is West.

(1) To find *true* when given *magnetic* bearing. Subtract the variation; if the result is minus, subtract it from 360°.

Examples. Magnetic bearing is 9°, find true.

Given variation 16½° W.

$$9° - 16\tfrac{1}{2}° = -7\tfrac{1}{2}°$$
$$360° - 7\tfrac{1}{2}° = 352\tfrac{1}{2}° = \text{true bearing.}$$

(2) To find *magnetic* when given *true* bearing. Add the variation; if the result is greater than 360°, subtract that from it.

Examples. True bearing is 349°, find magnetic.

$$349° + 16\tfrac{1}{2}° = 365\tfrac{1}{2}°$$
$$365\tfrac{1}{2}° - 360° = 5\tfrac{1}{2}° = \text{magnetic bearing.}$$

B.—When the Variation is East.

(2) To find *true* bearing when given *magnetic* bearing. Add the variation; if the result is greater than 360°, subtract 360° from it.

(2) To find the *magnetic* when given *true* bearing. Subtract the variation; if the result is minus, subtract it from 360°.

To Find the Direction of True North.

This may be done without the aid of a compass:—

(*a*) By day, by an observation of the sun.

(*b*) By night, by an observation of the stars.

By an Observation of the Sun.—"The sun, speaking generally, rises in the east and sets in the west. Outside the Tropics, it is at noon approximately due south of an observer in the northern hemisphere and approximately due north of an observer in the

southern hemisphere; the statement, however, regarding the rising and setting of the sun is only accurate at the equinoxes; at other times there will be less or more variation according to the altitude and time of year, amounting in London to 38½° north at midsummer, and 38½° south at midwinter."

The following is an accurate method of finding the true north:—

"Lean a pole pointing northwards on two cross sticks (fig. 12). From its tip drop a plummet line to the ground at A."

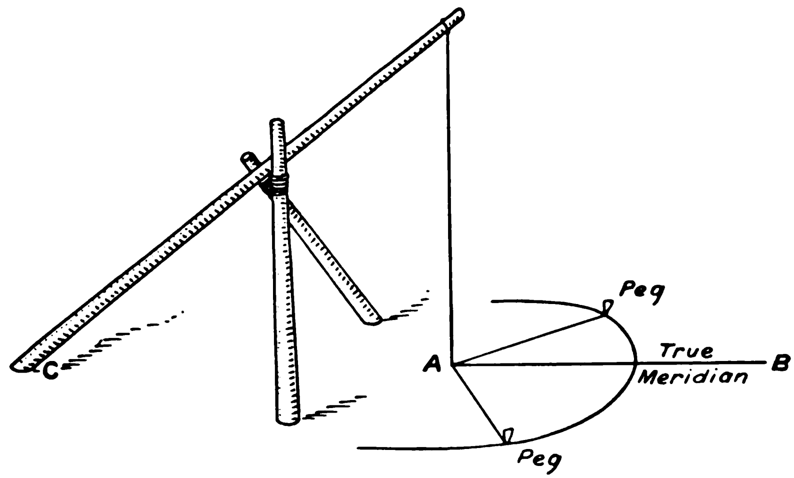


FIG. 12.

"From the point thus found as a centre and at a convenient radius describe a circle. Before noon watch the shadow of the pole as it gradually gets shorter and shorter, till at last the top of the shadow will just touch the circumference of the circle. Mark this spot with a picket. The shadow will continue to shorten until 12 o'clock, and will then lengthen again. Watch it as it creeps out until it again just touches the circumference of the circle; mark this spot with another picket. Between these two observations the sun must have "culminated" or reached its highest point in the heavens. If, therefore, the arc between the two pickets be bisected and a line A B drawn from the centre of the circle to the point of bisection, the direction of the true meridian or north and south line, will be obtained."

"Then from some point C on the line B A carefully produced,

take an observation of the two points A and B, and note the reading of the compass; the difference between the compass reading and 360° (or 0°) will be the variation of the compass; if the compass reads 10° it is evident that the compass bearing 360°, or magnetic north, lies 10° W. of the true north, and that its variation is 10° W.; if it reads 345° it is evident that the compass needle (or bearing 360°) points 15° E. of true north. The ground on which this operation is carried out must be perfectly smooth and level." ("Notes on Map Reading for Use in Army Schools.")

To find the Approximate True North with a Watch :—

"*In the Northern Hemisphere.*—Hold the watch horizontally with the face upward. Point the hour hand at the sun. Then a line from the centre of the dial to a point half-way between the figure XII. and the pointer of the hour hand is approximately a *south* line."

"*In the Southern Hemisphere.*—Hold the watch as before, but in this case point the line from the centre of the dial to figure XII. at the sun, then the line found as above is in this case approximately a *north* line."

"*Note.*—This method is a very rough one. It should never be used in the Tropics, and the higher the latitude, *i.e.*, the further from the Equator, the more reliable it is."

To roughly estimate the compass degrees from a watch, the figure XII. may be taken as 360° (or 0°) and the interval between each minute marked on the dial will correspond to an interval of 6° as shown on the compass.

To find the Direction of True North by Night :—

"(*a*) *In the Northern Hemisphere.*—The Pole Star and all the stars of the universe circle round an invisible point, P (fig. 13), the Pole Star, at an angular distance therefrom of 1° 19′; it is evident, therefore, that twice in every twenty-four hours the North Star, N., must come in the same vertical plane with it. Therefore by taking the bearings of the North Star when it is vertically above, or below the Pole, we are really taking the bearing of the Pole itself, *i.e.*, of true north. The North Star is in the same vertical plane with the Pole when the star Zeta, 'ζ,' the last but one from the end of the tail of the 'Great Bear,' is vertically above or below it. This can be ascertained by a plumb line, and the direction being picketed out on the ground, the bearing can be taken by daylight, and the variation of the compass ascertained."

"In order to identify the North Star, note the following diagram (fig. 13) of the seven stars of the constellation known as the 'Great Bear.'"

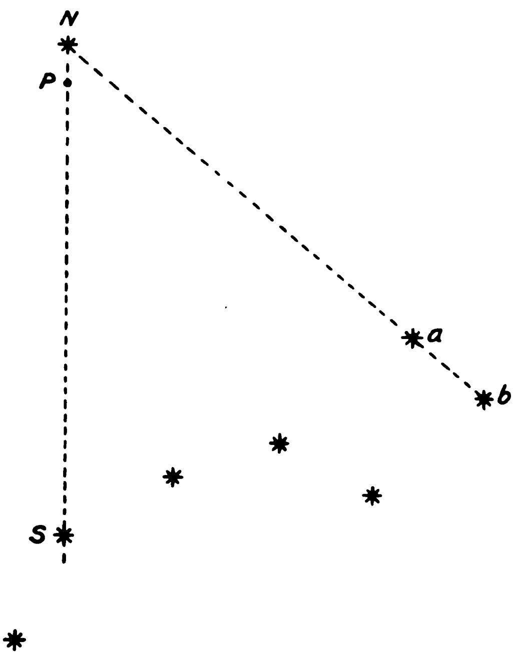


Fig. 13.

a and *b* are the pointers, so-called because they point towards the Pole or North Star, N., which is the last star in the tail of the "Little Bear." S is the star Zeta, "ζ," in the tail of the "Great Bear."

(*b*) *In the Southern Hemisphere.*—Consider the Southern Cross as a kite; prolong the greater axis four and a half times in the direction of the tail, and the point reached will be within 1° of the South Pole. If a piece of paper be marked off with nine equal divisions on the edge, and held so that the first and third divisions coincide with the head and tail stars respectively, the ninth division will give the approximate South point.

The Protractor.

Every officer who takes up the study of military map reading should purchase a protractor and make himself thoroughly conversant with its various uses. This he can do by a trivial expenditure of money and time, for which he will be amply repaid. The following description of the instrument has been taken from official books:—

The Service protractor is an instrument graduated on one side with a series of degrees, similar to those of a compass, radiating from the centre of the inner edge, which is marked with an arrow head. It is made of boxwood and is exactly 6 inches in length. The degrees up to 180 are shown by the outer row of figures, those from 180 to 360 by the inner row.

To Lay-off a Bearing.—Place the protractor on the map with the radiating centre, which is marked by an arrow-head, on the spot from which the bearing is to be ascertained, the inner edge of the instrument pointing north and south. For bearings up to 180°, the graduated edge of the protractor is placed to the right or east; for bearings 180° to 360°, the graduated edge of the protractor is laid to the left or west.

To Take off a Distance.—There is also a scale of inches on the Service protractor from which lengths measuring decimals of inches, such as are required in constructing scales, can be measured. The first place of decimals is given by the subdivisions on the bottom line of the decimal scale, the second place by counting upwards the required number along the diagonal line starting from the first place of decimals. Thus, for a line 2·5 inches, put one point of the dividers at the figure 2 on the main scale, and the other at the fifth division on the bottom line of the decimal scale. For 2·55 count up to the fifth horizontal lines on the fifth division in the decimal scale and measure from that point along that horizontal line to the second division on the main scale.

The protractor shows two scales of yards:—

(*a*) 2 inches = 1 mile, which can also be used by doubling distances for maps on the 4-inch scale; or by halving distances for the 1-inch scale.

(*b*) 3 inches = 1 mile, which can also be used by doubling distances for the 6-inch scale. On both scales the primary divisions show hundreds of yards.

Two other scales are provided for use with maps of $\frac{1}{100000}$ and $\frac{1}{250000}$, or for such factors as $\frac{1}{500000}$.

Information is given which would readily enable one to convert foreign measures of length to the British standard, and a scale is presented showing the horizontal equivalents of various degrees of slope with a vertical interval of one foot.

Setting a Map.

Before one can compare a map with the ground which it represents it is obvious that the map must be so arranged that

the different railway lines, roads, &c., on it coincide in direction with the corresponding objects on the ground; or, in other words, the map must be set. A map is said to be *set* when it is laid out to correspond with the ground, so that the true north on the map points to the North Pole; or the magnetic north on the map points in the same direction as (*i.e.*, parallel to) the needle of the compass. If the direction between features on the ground be now compared with these directions as shown on the map, they will be seen to be parallel. To express this somewhat differently, by setting a map is meant placing it in such a position relating to the ground it represents, that lines or "rays," drawn from the point on the map denoting the position of the observer to any other known points on the map, *coincide in direction* with the imaginary lines proceeding from the eye of the observer to those points as they are actually seen on the ground.

The following diagram (fig. 14) will more fully illustrate the above definitions. It is introduced because it is absolutely necessary that the student of map reading should have an accurate knowledge of the subject under discussion, and that he should fully understand both the theory and practice of map setting.

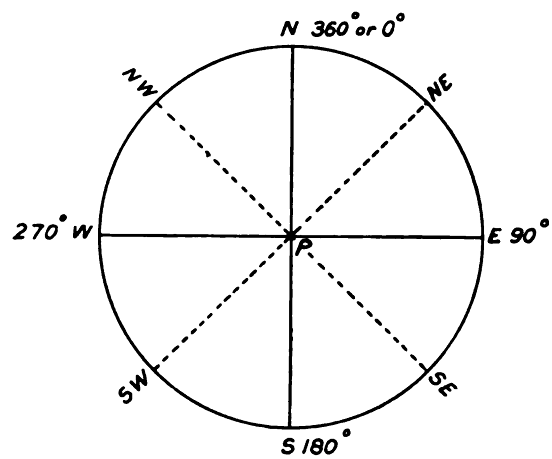


FIG. 14.

Fig. 14 shows the four cardinal and intermediate points of the compass. Supposing an observer, standing at P and facing north, has a map spread out before him with the north of the map pointing to the North Pole, it is obvious that the other points of

the compass on the map will correspond with the other points of the compass on the ground, and that features seen on the ground from P will coincide in direction with those features as represented on the map. Moreover, it is obvious that so long as the map is undisturbed it will be found to be set to the country from any point of view at which it may be looked at by the observer.

Methods of Setting a Map.

A. With a Compass.—If the magnetic north line is shown on the map, lay the compass over it, producing the line if necessary. Then, without disturbing the compass, turn the map slowly round until the north and south points of the magnetic line are exactly under, or are exactly parallel to, the north and south points as indicated by the needle of the compass. If the true north line only is shown and you know the local variation of the compass, plot the magnetic north on the map with a protractor and proceed as before. If you have no protractor, lay the compass on the true north line and turn the map until this line makes with the needle an angle equal to the variation and on the correct side of it. Thus with a variation of 17° W., the map would be turned until the true north line was 17° to the right (or east) of the needle of the compass.

The sides of rectangular Ordnance maps of Great Britain are drawn parallel to a true north and south line running through Delamere Forest; in the extreme east and west counties they will vary about 4° from a true north and south line; they are therefore only approximately north and south. They may, however, in spite of this possible error, be used as true north and south lines in setting a map by this method.

B. Without a Compass.—Assuming the observer has ascertained the point on the map which represents the position he occupies, he may set the map by following these directions:—

(*a*) Identify on the map some distant conspicuous object which can be seen in the surrounding landscape. This object (church spire, windmill, &c.) should be as distant as possible.

(*b*) Draw a line on the map from the point representing your position to the representation of the distant object chosen.

(*c*) Turn the map round the point, marking your position till this line points to the distant object (fig. 15).

(Instead of actually drawing a line as directed in (*b*), a ruler or straightedge may be adjusted so that its edge passes through the two points (*d*) and (*e*). The map is then turned until this edge points directly from the eye of the observer to the distant object.)

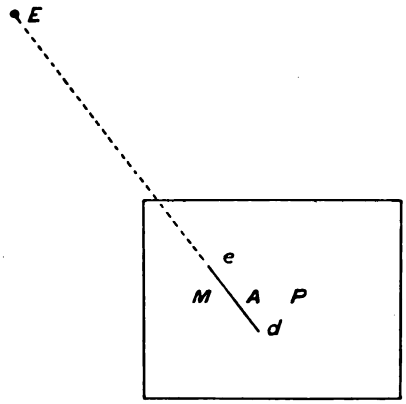


Fig. 15.—*d*, Observer; *e*, distant object on map; *E*, distant object on ground.

Frequently the map can be easily set by placing the representation of a straight road or railway line on the map immediately over, or in continuation of, the corresponding road or railway line on the ground. Objects on either side of the road or line should then be observed to see if they correspond in position with their representations on the map.

The map may be *roughly* set by adjusting it so as to correspond with the north and south line as ascertained with a watch, and of course this may be precisely accomplished if the true north point is fixed by an observation of the sun or stars by the accurate methods previously described (see figs. 12 and 13).

The following is a description of how to set a map, or check the setting of a map, by what may be called the "sundial" method. The sun at noon is due south in the Northern Hemisphere. Its angular speed from east to west, if measured on the horizontal plane of the ground, may be roughly estimated at 15° an hour. Hence at 3 p.m. the sun is approximately true south-west, for if the points of the compass are referred to (fig. 10), it will be seen that south-west is 45° from south. If, therefore, on the margin of the map a small circle is drawn to represent the compass, with its north and south lines parallel to the border of the map, and the principal points marked thereon, the shadow of a pin, placed upright at south-west, should pass through north-east at 3 o'clock, and if it does not do so, or nearly so, the map is not set with the sun, and must be shifted until it so corresponds. Extreme accuracy is only obtainable at noon. At that hour the sun in this part of the world is exactly due south, and the shadow

of a pin, inserted vertically at south on the circle, may be relied upon to point due north. For an hour before and an hour after mid-day the calculations of 15° angular speed may also be fairly relied upon; but at a greater interval of time the observation is only approximately accurate. For military purposes it is, however, sufficiently useful. ("Studies in Map Reading and Field Sketching," by Lieutenant-Colonel Wilkinson Shaw.)

To Find One's Position on the Map.

It may be remembered that when dealing with the way to set a map by objects without a compass, it was assumed that the observer knew his own position on the map. It may, however, be necessary for him to fix his position, and to do so without the aid of a compass or other ready means of setting the map. This may be accomplished by what is known as the adjustment or tracing paper method now to be described.

By Adjustment.—Three objects on the ground, which are shown on the map, are selected (fig. 16, *A B C*).

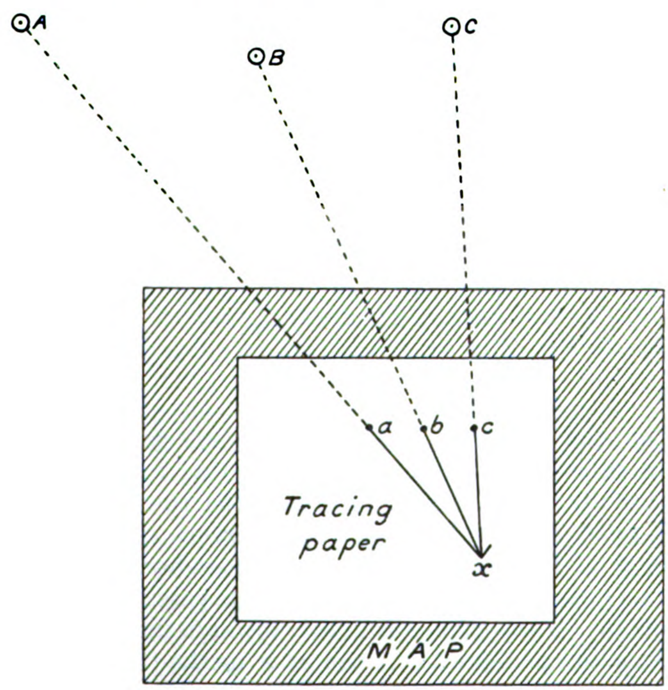


Fig. 16.

A piece of tracing or other transparent paper is spread out on a flat surface in front of the observer, and a pin is driven into this paper so as to stand vertically at any convenient point, x. Then, from x, rays are drawn along the straight edge of a ruler, which is carefully aligned by the observer's eye on each of these selected objects in turn. The rays will appear as xa, xb, and xc in the diagram. The tracing paper is now applied to the map and is moved about until the rays xa, xb, and xc pass through the representations of A, B, and C. The point x is then pricked through and marks the position of the observer on the map.

If the map can be set by the compass, the position of the observer can be ascertained by "resection."

By Resection.—The map is first set. Two objects which are observed on the ground (at A and B, fig. 17), and which are

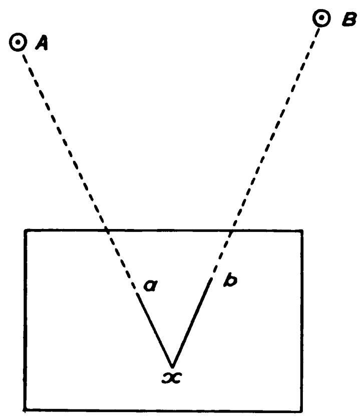


Fig. 17.

marked on the map (at a and b), are selected. The straight edge of a ruler is placed on the map so as to pass through a, and is carefully aligned on A. Keeping the ruler in this position, a line is ruled from a towards the observer. It is obvious that the position of the observer must be somewhere along that line. The ruler is then adjusted, with its edge passing through b and aligned on B. A second line is drawn towards the observer from b. The intersection of these two lines at x marks the position of the observer.

(*To be continued.*)

THE PRACTICAL DUTIES OF A QUARTERMASTER, ROYAL ARMY MEDICAL CORPS, IN A GENERAL HOSPITAL, AND INFERENTIALLY IN ANY OTHER FIELD MEDICAL UNIT.

By A QUARTERMASTER.
Royal Army Medical Corps.

No better illustration of the duties of a Quartermaster can be given than by first describing what a general hospital appears to be on mobilisation, and into what it develops when that mobilisation is completed and the active operations lengthen, for in one way or other the quartermaster is directly associated with every department of a general hospital except the actual treatment of sick and the preparation of medical statistics.

The equipment authorised for a general hospital is given in detail in A. F. G. 1098-61, and for purposes of this paper we will assume that buildings are not available and that the hospital has to be created on the field at some distance from the immediate resources of civilisation. If we do not assume this, then the duties of the quartermaster will differ very slightly, if at all, from his ordinary duties during peace, and I will not insult my fellows by assuming that they require any information on the subject of their ordinary duties. In the case of a general hospital under canvas, however, the work is different, though based upon the knowledge gained during peace; the duties are so varied that I am sure the younger generation will pardon me for thinking that a study of my remarks will not be time wasted. We shall find, then, that for the field, the equipment as authorised by scale is inadequate and must be supplemented.

I will ask the reader to follow me in the spirit, as we draw our equipment and proceed to the appointed site on which we shall pitch our hospital — we will only glance at the actual mobilisation.

Orders have been received for No. — General Hospital to mobilise for service abroad. The *personnel* has been collected at the rendezvous, and the quartermaster with his staff proceeds to the mobilisation store in the district and takes over (not in detail) the stores of the general hospital, which have been stored there ready during peace. The stores of this hospital have been inspected periodically by the officer commanding the unit or some

one on his behalf. I need not, however, enter into this part of our military interior economy, if I may use such a term; it has nothing to do with the quartermaster, and I only mention it to ease the conscience of our young quartermaster, who, perhaps for the first time in his life, is ordered to take upon himself a very serious responsibility. He will see that these stores are loaded on to whatever transport is provided. He has no vouchers to prepare. All is done for him by the ordnance people, and, indeed, it is just possible that the ordnance will load and ship all the stores without troubling the officer commanding or quartermaster. The clothing from Pimlico will be treated in much the same way. The medical and surgical equipment, which is also stored ready for issue, will either be sent to the rendezvous, drawn by our quartermaster personally or be put on board ship. Do not worry! The wise quartermaster, knowing for some time past the unit to which he will be attached on mobilisation, has looked into all these little matters, and in a quiet way has made friends (personally or by a nice letter) with all the people with whom he will have to deal. It is but natural that some little excitement should exist at the time of mobilisation, especially so in the Royal Army Medical Corps, where the *personnel* is drawn from so many different places—all are strangers to each other. The commanding officer knows not the quartermaster, and the quartermaster knows not the commanding officer; there is consequently a feeling of restraint which will wear off as time and confidence increase, but our wise quartermaster is quite cool and collected, he knows just what he has to do and how to do it; he has just confidence in himself, and such a man will soon find (much to his comfort) that other people have confidence in him too.

Let us assume that all these preliminary arrangements have been satisfactorily carried out, and our unit has arrived at the port of disembarkation. Now the quartermaster is on his own. If the unit has to go further afield by road or rail he must see his equipment loaded, and in fancy I can see the sensible quartermaster, notebook in hand, recording each package by its mark or number as it is landed, and noting the number of the truck or wagon into which it goes.

Believe me, you will be very sorry, sooner or later, if you do not take a real live interest in the loading of your stuff—not a fussy interest which only annoys people, but a quiet take-in-know-all-about-it interest; let your subordinates realise by actual sight from the beginning that they have a man to deal with who knows his

business. It will save you much trouble, and your people will work much better. Do not do another man's work. Mind your own business; and here I may be pardoned if I digress and give the commanding officer a bit of advice: it will not be misunderstood coming from a man of my age and service. Do not, because you know your quartermaster to have been a good clerk, be *constantly* asking him to revert to his former position and guide you in this and that; give the man a fair chance to do his own work; he might, from fear of giving offence, do all you ask of him, and he might (but I hope and believe it is a very small might) do so from a desire to secure favour for himself (a clear evidence of weakness). In either case his own work will suffer, and you will one day regret it, for as we proceed we shall see that the quartermaster has quite enough, if not too much, to do as it is.

Having loaded our stores, we have little else to do until we reach our camping ground, when the real hard work begins. The commanding officer has no doubt already prepared a plan for his camp, but the best of prepared plans have to be sometimes altered to suit the configuration of the ground. As a guide I can hardly do better than give you a word picture of that general hospital in South Africa, of which a very high official and the members of the Sanitary Commission spoke in such flattering terms. In fact, we will rebuild this hospital together. The scenery required is a railway station, a river with a drift or crossing, and across this river a splendid tract of fairly level veldt of perhaps 100 acres, with hills beyond.

The unloading of the trucks, the carting of the stores across the drift, take a considerable time, but while one party is engaged on this, another is pegging out the camp. The head of the camp faces river and rail; it is separated into medical and surgical divisions, at a distance apart sufficient to enable the store tents, kitchens, surgery, &c., to be erected down the centre and have a wide roadway on either side. The various offices are in the front. The officers' camp on one side and the nursing staff on the other, each camp hidden from the view of the other by a natural, though slight, ridge, which, running the whole length of the camp, affords an excellent drainage outwards. I cannot liken the plan of the camp better than to a man lying flat on his stomach with his arms extended forward, divide the body down the centre, draw one half apart from the other, cut off the arms and head, carry them forward, and you have the camp, the arms being the officers' and sisters' camps, the head the various offices, each half body the

medical and surgical divisions respectively. The legs cut off and removed backward would represent the *personnel* camp, down the centre the stores. On the outer flanks of the divisions are the latrines and ablution rooms. Dig a good-sized trench round each half of the body, connect by cross-trenches running down each row and each side of marquees, and you have the system of drainage. One large main trench carried the water completely away.

Our stores having been brought over and deposited in a convenient spot for distribution, the marquees erected, and the men's camp pitched, we are now ready to issue equipment to the wards. We have, in our spare (?) time, prepared an ordinary ward-book by writing down in a column the articles required for each ward, and cutting the leaves so that this list is exposed at any page. We issue, say, six or eight cots to each marquee, making an entry in our book as we do so against the ward; mattresses, bolsters, pillows, &c., &c., follow in turn, and in a very short time we have not only equipped our wards, but have ready a very long roll from which to prepare our ward inventories. The chief ward master of each division can now sign this book in acknowledgment of receipt, and the remainder of the stores can be transferred to the several store tents. The cook and his staff have by this time got the kitchen into fair working order. The compounder has set out his surgery. The clerks have arranged their offices, and the next thing is to erect more permanent latrines and ablution rooms, and to arrange something more satisfactory than the river and a water-cart for our system of water supply. Up to this point everything has been going smoothly, but now we are confronted with the fact that nothing exists for the provision of these necessary places, and that the filters provided require too much supervision and labour. The engineer department must be called in (if this has not already been done), corrugated iron sheds must be put up for latrines, buckets must be provided, a system of conservancy instituted, a site selected for refuse and other pits—this we find on the opposite slope of the hills at the back of our camp, about a mile distant, with a certainty that the natural line of filtration leads away from the river. We now find that we need sanitary carts to remove night soil to these pits, and oxen to draw them. Our hospital equipment is beginning to expand. In addition to sheds for latrines we must have similar buildings for ablution rooms. Where are the basins? The 14-inch I.E. are not suitable. We must demand. How is the waste water to be disposed of? Carried by channels through

the hut into our main trench? Possibly, for a time this may do, but we shall find that the channels become filthy, even with the aid of conducting-pieces of corrugated iron, and the final place of deposit becomes a nasty swamp, threatening danger to the health of our people. So we continue our expansion, and dig a big hole, or have one dug (same thing), outside our ablution room, and into this we sink a large, round, corrugated iron tank, and we run the waste water into this, and empty it into our sanitary carts to be carried away to our pits; but we find the process of emptying these tanks by means of a bucket and rope to be very laborious, so we demand pumps, force and lift, 60 feet. What with extra carts, extra labour, &c., we find that not only is our equipment increasing, but we are adding to our *personnel*, and the horse lines and native camp, pitched at a respectable distance on our right flank, are growing considerably.

The water question has in the meantime been settled by erecting a small pumping engine down by the river-side and forcing the water into tanks erected on the left flank of our camp. The water is dirty; we must therefore devise some means of filtration. This is done by running the water through a series of tanks at descending levels in which a coarse filtering apparatus with sand and stones has been placed; from the last tank (the only one, by the way, having a tap) we get fairly clean water, good enough for cooking purposes, but unsafe for drinking, and, as we before remarked, the hand-filters take too much looking after; consequently, in spite of a notice on the tank "unfit for drinking purposes" men will go for this unsafe water, and later on we shall have a few cases of typhoid. The introduction of a large filtering cistern fitted with many candles was a blessing to everybody. The filtration by hand labour and boiling of water for drinking purposes required such a lot of supervision that, from a labour point of view, it was heart-breaking.

The water having been laid on we see no reason why we should not carry it to the kitchen—which is now an excellent iron building with decent ranges and hot plates—and also to the ablution rooms.

All this time we have been treating sick and wounded and we will come back to them later, but at present we are dealing with the compulsory expansion of our hospital, and while we have the engineers with us we might as well use them; so our canvas stores and surgery gradually give place to iron buildings. An operating theatre with X-ray room follows as a matter of course, and more

equipment is required. We, by now, are beginning to find faults, the ground around the kitchen is sloppy also; we catch orderlies throwing waste water on the ground, outside their tents—the cry is, "I have nothing to put it into." Slop buckets are away, perhaps, for some good reason. However, it is a dangerous practice, leading to serious abuse, and we must stop it. Sanitary buckets on carriages are introduced (these now form part of the equipment of a general hospital), one for each of four marquees, and extra natives are taken on. To remedy the sloppy state around the kitchen we run an underground drain from the kitchen to outside the camp, which carries the water into a similar tank to those beside the ablution rooms. This is very nice for a time, but the drain gets choked with grease and we improvise a grease trap, but, oh, the trouble of that tank! How many poor niggers were fined for not keeping it clean I should not like to say. Our hospital has expanded by this time far beyond the limits of the mobilisation store table, and the quartermaster has been a busy man—he has taken a hand in everything up to the present.

We find a very fine incinerator at the back of our camp, and sometimes we wish it was not there, for, unfortunately, no one seemed to suggest a movable incinerator, which could change its position with the wind. There is also a Thresh's disinfector under a cover, with an elaborate arrangement of doors to prevent all possible contact of dirty articles with clean. Roads have gradually developed themselves with a little assistance, and a bridge has been erected across the river.

Now we can have a look at our patients and see what improvements have been made for their comfort; the terribly heavy, horribly useless, and frightfully expensive canvas waterproof bottoms, in four pieces, to quote the nomenclature, have been replaced by substantial wooden bottoms (I think these canvas bottoms are now eliminated from the scale), electric light has been installed, the power being provided by an engine at the railway station, many little tidies and knick-knacks have been introduced by the sisters, and the wards have an appearance of comfort quite equal—in fact, with the walls dropped, the sun shining and lovely pure air all around, superior to a ward in a hospital at home.

The question of hospital supplies, fortunately, has given little or no trouble, for at the station there is a well-conducted supply depôt, and the manner of obtaining and accounting differs very slightly from peace methods.

We now find our sick and wounded increasing in numbers

hospital trains are coming and going with their loads
ıffering men, and almost daily can be seen the train of
etchers bearing their human freight from station to
'e have not yet been open three months and yet our
ıospital has increased to 1,000; a building close to the
ɔeen opened as an officers' ward, ultimately to be trans-
orrugated iron building erected well to the front of our
average daily sick for this month reached over 800, by
ing the highest reached, but it shows clearly that our
al, in this short time, is a very different article to the
ıted by the mobilisation store table, and that while
ur out-offices we have not been neglecting the expansion
or.

take up too much of the limited space of this journal
e all that this expansion meant in the way of work to
naster; on him devolved the working out of a scale of
o meet the ever-increasing sick-rate, for it does not mean
Stores become cramped, kitchens incapable of coping
lditional cooking, the ablutionary and latrine arrange-
l enough for and equal to the requirements of 500—will
,000, refuse pits must be enlarged, more sanitary tanks
carts are needed, and the absolutely necessary super-
sanitation of the camp occupies much time, but it is
k and pleasant. To see the satisfaction expressed on the
commanding officer when night brings a temporary
temporary, for we frequently receive convoys and
alids during the night—is sufficient compensation,
e eight-hour-a-day limit is often multiplied by two, but
onic in the cheerful "good-night" of some people that
ous power.

ter is now approaching and wise locals say we cannot
er canvas, but we do, and for two winters after, on the
l; and what is stranger still, our men were healthier in
months of our camping than in the first. I think I am
ng there was an entire absence of typhoid amongst the
ough the medical division was full of cases; however,
has nothing to do with the duties of a quartermaster.
as, in more ways than one—if the sanitary officer is the
e quartermaster is his clerk of the works. But to return
ct, Primus and other heating stoves were obtained and
e ward inventory necessitating more expansion in the
oil store and lamp room. The men, too, will need

additional comfort if they are to be kept fit for hard work—for hard work it is. A serjeants' mess-canteen and recreation room are erected, stables built for horses, and everything made nice and snug for the cold winter nights. In all these things the quartermaster is the commanding officer's right-hand man, who must arrange for the carrying out of the conceptions of his commanding officer, and it is unfortunate for the efficiency of any unit where confidence and respect between these twain do not exist. To get the best out of a man you must possess something more than the right to command.

I think I need go no further in my description. I know it delighted the hearts of many to see our regular lanes lit with electricity, our well-kept and well-formed roads, our workshops—for we had by now tailors, carpenters, bootmakers, and sailmakers, each in their own canvas shop busily plying their various trades.

Our model laundry at the river-side, well below our water-works, would compare very favourably with some of the laundries at home. The washing was first done by contract but we found it better in every way to do it ourselves.

The daily supervision of this large canvas town alone was enough for one man. Scrupulous cleanliness is an absolute necessity for health's sake. One would think that our quartermaster's duties are heavy enough in all conscience, but the "exigencies" of the Service (what a lot that word covers) require a little more to be put on the back of the willing camel. Invaliding soon commences, and, as the corps to which the men belong cannot clothe them—many are in rags—the duty falls upon the hospital authorities, so our quartermaster has to open a small Pimlico store and clothe invalids before their departure. In this way some 6,000 men were clothed in this hospital alone, not all invalids, true; some were "fit to return to duty," but all were clothed.

I fear I have already taken up too much space and so must bring my paper to a close. The duties of a quartermaster in a general hospital can, from the foregoing remarks, be better imagined than described. The methods whereby he carries on his multitudinous duties would take up too much space to tell here. The creation of a quartermaster is a gradual process, his education commences as a private soldier, his knowledge grows with him, he cannot say when or where he learnt this or that. Regulations have been his textbooks, but experience (often very bitter) has been his teacher. No man, unless so trained, could open a hospital such as I have described (this one was not singular, there were others

equal), expand it, and finally close it with all books balanced and stores accounted for.

To hand his commanding officer a clear acquittance from ordnance, remount, and supply, after nearly three years of field work is surely something for our quartermaster to be proud of.

What was expressed in the final hand-shake between commanding officer and quartermaster (both through from start to finish) cannot be conceived by any but these two. Starting together as strangers, they separate, perhaps never to meet again, with a mutual respect and confidence that could only be evolved by an association of this character.

It must not be imagined that we have been neglecting ourselves all this time. Vegetable gardens appeared as if by magic. Tennis courts were made, cricket and football played on the open space in front of hospital, to the enjoyment of those partaking, and those convalescent patients who were able to look on. As frequently as possible we would get up regimental sports. You doubtless again say, What has this to do with our quartermaster? You have not seen half of his many-sided duties, for if sport has not a claim on him regimentally, it has indirectly. He ought to show a very great interest in these matters. His very close association with the men, without the restraint of disciplinary obligations, enables him to come into closer touch than could the commanding officer or the serjeant-major. Nothing conduces more to the creation of a healthy *esprit de corps*—a co-partnership, so to speak, without which no unit can produce its best results—than the introduction of sport, in which all ranks take an interest either as players or lookers on.

I cannot conclude without a little advice to the young men coming on. You cannot do everything yourself. You have passed from the workman stage to become a supervisor; but there are some things that the wise quartermaster never delegates to others. Keep all accounts and ledgers yourself. Keep a record yourself of all that comes in and of all that goes out. Let this be your daily task—let the book be your very bible, for if *you know this* you may safely leave the interior distribution to your staff, subject to supervision of course.

For the benefit of those who perhaps never give a thought to the work of the quartermaster, let me quote from documents before me.

The 520 beds increased to 1,320, with all that that increase meant; 557 watches, £4,275 in cash, and many other valuables

belonging to patients passed through the hands of the quartermaster, who was responsible to the commanding officer for their safe custody; arms innumerable, &c., were transferred to the ordnance, and many questions from corps were satisfactorily answered; clothing was supplied to invalids, and over 413,000 diets were issued, yet the work was carried on smoothly.

Without doubt the credit was due to our commanding officer, a man who knew his business and had that rare faculty of recognizing that others, too, knew their part of the business, and, by letting each responsible head carry on his own work and not interfere in the work of another, harmony prevailed and efficiency resulted. Each man connected with the hospital felt that he had a right to assert his claim to having contributed his share towards the earning of that great compliment—

"A pattern to every hospital in South Africa."

United Services Medical Society.

THE MANAGEMENT OF VENEREAL DISEASE AT WOOLWICH.

By Lieutenant-Colonel J. B. WILSON.
Royal Army Medical Corps.

The subject of venereal disease, or anything connected with it, may seem rather a well-worn topic to bring before this meeting. But on looking round the surgical division I found that in the short time I had been at Woolwich I had not been able to collect a sufficient series of any one class of cases of surgical interest to bring to your notice.

I was, however, struck by the work done by my then colleague in the Division, Major French, the Specialist in Dermatology for the last four years or so, in the reduction of venereal disease in Woolwich during that time. I therefore thought a few notes on the subject might be of interest. In presenting them to you I beg that you will kindly remember that I do not claim to speak as one having authority. On the contrary, I do so with the utmost diffidence. But these few remarks may open the way for discussion, perhaps by some of those officers who have made the subject peculiarly their own, and whose words should be listened to with that respect which their weight deserves. Should this be the case I am content that any opinion which I, as a non-expert, may advance should be looked upon as a thing of nought. I have in my possession a considerable mass of statistics on these matters, which, however, I do not, for two reasons, propose to inflict on you.

The first is that I personally distrust statistics. In the words of the Army Act, I look upon them with alarm and despondency; as Fournier says: "They are all right if they support your contention; otherwise they are useless." Besides, statistics, even if quite accurate, would give no measure of the work done in a case of this kind.

Regiments and other units at Woolwich are constantly changing. A unit showing a great decrease in venereal owing to the exact methods and constant supervision employed there, may be moved away and replaced by one which has not had these advantages, and which would therefore fill up the venereal wards once more.

Nevertheless, I think I may mention the following figures as

giving some idea of what has already been accomplished, as well as what remains to be done.

I find that the admission-rate per 1,000 of strength for the garrison for all venereal diseases for the last eight years was as follows :—

1901	126·5
1902	307·6
1903	161·5
1904	131

And in Major French's period :—

1905	85
1906	76
1907	80
1908	40

No doubt this coincides with a general decrease throughout the Army, owing, among other reasons, to greater supervision and improved methods. However, reckoned even by statistics I think the rate of decrease at Woolwich can be shown to be considerably greater than at most other stations, which serves to show the value of the methods employed.

I will now endeavour to discuss shortly the routine by which these results have been brought about.

At Woolwich cases of venereal disease are all admitted to the surgical division of the Royal Herbert Hospital. The Officer in charge of the Division has a specialist officer serving under him. When a man reports sick with any kind of venereal disease he is sent to the clinic of the latter, who thereupon takes charge of him practically until he is cured. All the syphilis cases and all men attending for treatment or observation go to this clinic. The syphilis register and other documents are kept up by the specialist, who communicates direct on these matters with Commanding Officers. He has a special clerk to assist him in these duties.

This centralisation of work is, I think, the essential feature in the arrangement. Practically the whole control of venereal disease in a station is in the hands of one man ; all cases are treated under his supervision. He has a free hand in dealing with the matter, and is of course a specialist on the subject.

In this connection I may quote the following from the standing orders of Woolwich garrison, 1908.

No. 186.—"Men undergoing weekly treatment at the Royal Herbert Hospital will attend at such hours as may be directed. It is of vital importance that the attendance should be regular, and no man undergoing such treatment is to be allowed to leave the

station on furlough or otherwise, without the cognisance and approval of the medical authorities."

My experience in other stations has been that there is a good deal of practical difficulty and a considerable mass of correspondence with Commanding Officers involved in getting men to attend either for treatment or surveillance with any degree of regularity.

I think it is scarcely necessary to point out how very greatly an order like the above strengthens the hands of a man who is endeavouring in any garrison to carry out the systematic treatment and supervision of these diseases.

Turning now to the treatment of these cases while in hospital, I do not think it differs in any important particular from that pursued elsewhere.

Each class of cases is treated in a separate ward. One large ward is adapted as a kind of theatre, where all operations are performed. Irrigation in the gonorrhœal cases is carried out here and mercurial injections are given to out-patients who are being treated by this method.

The small annexe at the entrance of the ward is used as an office, where the forms and books are kept; and correspondence relating to venereal cases is dealt with here. It other words, what a visitor would see on an out-patient morning would be as follows:—

(1) A very small room with a clerk at a small table, a type-writing machine, and some nominal rolls and case sheets.

(2) A large ward where the specialist officer, together with a junior officer and some trained orderlies, was dealing with a large crowd of patients, each of whom in turn came up for inspection and treatment.

The senior orderly in charge of this ward is invariably a man carefully trained in aseptic routine, and in the sterilisation of all instruments, appliances, and dressings, and he works on practically the same lines as the man in the ordinary surgical theatre.

When I joined at Woolwich I certainly thought this arrangement both instructive and suggestive. To my mind the small room with the one clerk represented the "paper" part of the transactions—in fact, official correspondence and red tape.

The large ward, with the busy people attending carefully and systematically to the requirements of each of their many patients, represented to me the practical or working part of the arrangement.

I think I have always been able to trace a constant inverse proportion between these two elements in Service matters, and, in fact, in all human affairs.

Of late years one has received instruction from higher authorities on the necessity of limiting official correspondence. One has noticed with gratitude the strides made by our own administration in simplifying returns. So possibly I am not alone in having noticed this inverse proportion. At all events, the venereal clinic at Woolwich endeavours to carry these principles into practice.

With regard to actual treatment of patients in the wards there is not much to be said. As a general rule syphilis patients are treated by mercurial inunctions. This is done by the method suggested by Lieutenant-Colonel Dick, as a result of his observations on the very successful Continental practice at Aix-la-Chapelle. I cannot do better, therefore, than quote his own description of it so far as it is adopted at Woolwich, which will be found in the Appendix to Army Medical Reports for 1897:—

(1) Every morning the soldier has a hot bath at a temperature of 90° to 100° F.; a handful of washing soda is added to the water.

(2) Immediately after the bath he has 1 drachm of ordinary mercurial ointment rubbed into his body; the parts of the body selected on alternate days being legs, thighs, back, chest and arms. The rubbing lasts twenty minutes to half an hour. Syphilitic patients rub each other, a glass spatula being used for this purpose. The rubbing is done under the supervision of an officer.

(4) Gargles, or mouth washes, are used every hour, and the teeth are brushed after each meal.

(5) The treatment is stopped if any sign of mercurialism is noted.

(6) Forty inunctions make a course. They are given every day except Sundays. The same underclothing is used the whole time.

(7) Ulcers about the mouth are treated with a 10 per cent. solution of chromic acid.

Other methods are sometimes employed. Of late, for example, some of the arsenical preparations such as soamin and arsacetin have been tried. Up to the present we have not perhaps used them very extensively, but Major French showed me several cases in which symptoms had recurred rather rapidly after their use.

The method of treatment by mercurial injections is, as a general rule, reserved for out-patients.

In the gonorrhœa wards the irrigation treatment by permanganate of potash is the routine, as I understand it is generally throughout the Service. No doubt it is an excellent method, but it does not seem to me to greatly shorten the duration of the disease. I believe it is established by pathologists that after the very early

days of the infection the gonococcus has his habitat in the substance of the urethral mucous membrane, and in follicles and crypts out of reach of the injection. This being so, the irrigation treatment appears to me something like making a frontal attack on a position and sweeping the ground with a hailstorm of projectiles from the very latest thing in quick-firing guns and automatic rifles, while the enemy is sitting in, say, a coal-mine underneath.

It was with this idea that we obtained a supply of gonococcus vaccine and serum in order to try if this class of treatment would be effective. I am sorry to say that we had no marked success, at least in acute cases, although one or two cases of gonorrhœal rheumatism were greatly benefited by it.

I find that this coincides with the opinion expressed by no less an authority on this subject than Major Pollock (JOURNAL OF THE ROYAL ARMY MEDICAL CORPS, October, 1909); his paper came into my hands after our results had been made out.

We have also used staphylococcus vaccine in a few cases, but the number is as yet too small to report on.

The diagnosis of gonorrhœa in all cases is made bacteriologically. A man is considered fit to go out when he has been ten days free of discharge and the centrifugalised urine shows neither gonococcus nor pus.

With regard to gonorrhœa, I think a really effective treatment has yet got to be found. I would suggest that something in the nature of a vaccine seems more promising than the various methods of springing fluids through the lumen of the urethra to kill an organism which is not there. Very likely if the man could be induced to apply for treatment immediately after exposure to infection, or even in the first stage of incubation, such treatment might be successful. But this is just the one thing which the soldier will not do.

I come now to what is perhaps the most important part of the subject, namely, the treatment of these men after they leave hospital. For this purpose they may be divided into three classes, namely: (1) those awaiting diagnosis; (2) cases of syphilis; (3) cases of gonorrhœa.

The first class, viz., cases with venereal sore awaiting diagnosis, under paras. 1080, 1174, King's Regulations, attend daily for a few days, until they are fit for full duty, when they attend once a week. If they are N.C.O.'s they come on Friday at 9.30 a.m. They are thus seen separately from the privates who come on Saturdays at 11 a.m. Major French considers that these cases should attend

for four months before the final diagnosis is made; and this is accordingly done.

The second class, viz., syphilis cases, follow the same routine. They attend daily for a few days, then once a week, with the Friday or Saturday party, according to their rank.

The third class, viz., cases of gonorrhœa, attend daily with sick reports at 9.30 a.m. for one week. After this, once a week with the Friday or Saturday party, according to their rank, for three weeks. If after this they remain free of all signs of the disease they are sent to duty.

There is a Monday morning parade at 9.30 for all unavoidable absentees from the other parades.

In this way the whole thing is reduced to a system in the hands of an officer who communicates directly with Commanding Officers. He very soon learns by experience the multitudinous details necessary to the smooth running of the scheme, and he is able, with a minimum of trouble, to follow out each man on his lists and see that he puts in the requisite number of attendances.

This principle, or something like it, is now I think fairly universal throughout the army with regard to cases of syphilis, but I have not elsewhere seen it reduced to such an exact system. Major French was one of the first, if not the first, to apply it to cases of gonorrhœa.

When I was a student at Edinburgh University some twenty-five years ago, I remember my teacher, Professor Chiene, saying that if he was himself compelled to have one of the two diseases, syphilis or gonorrhœa, he would, on the whole, probably choose syphilis. Since that time, having seen a certain amount of the surgical complications following neglected gleet, such as stricture, urinary fistulæ, cystitis, and the various forms of pyelitis and surgical kidney, not to mention the septic joint complications and ophthalmia, I feel inclined to agree with him. It is with a view to prevent these complications that the system of supervision of gonorrhœa cases after they leave hospital was devised.

It would obviously be impossible for me to prove by statistics the enormous advantages of this system, for, naturally, it legislates more for the future than the present. I have noticed, however, that practically all the cases of severe complications that we get at Woolwich come from out-stations or abroad, and not from the place itself.

This concludes what I have to say about the Woolwich system of management of venereal disease. To recapitulate, the main points are:—

(1) Centralisation of the duties in connection with the whole subject in the Specialist Officer, who communicates direct with Commanding Officers.

(2) Recognition of the fact that gonorrhœa is almost if not quite as important a cause of sickness and disability among soldiers as syphilis itself, and the taking of measures accordingly.

(3) Recognition of the fact that the chief duty of the specialist is not so much the routine treatment of men inside the hospital as their careful supervision after they leave it.

To this I would add that the chief duty of specialist officers in this subject would be the consideration and adoption, in consultation with regimental officers and others interested in the soldier, of any means which can be taken to prevent these diseases.

I am fully aware that in the above remarks I have only touched the fringe of this subject. I do not propose to enter on the vexed question of legislative control of prostitution, or to consider the many arguments for and against it, although I think a glance at the history of venereal disease in the British army in India, for example, should not leave much doubt in anyone's mind as to its practical results. In any case, that part of the question is outside our powers and beyond our scope. I venture, however, to think that the control, to some extent, at least, of the disease among our men is not. The attitude most general in former times towards this question I think was this. The soldier would contract venereal disease to the extreme limit of his purse and opportunities. The duty of the medical officer was to stand by and endeavour to cope with the steady stream of diseased men flowing into his hospital. Should he have any private ideas of the morality or otherwise of these transactions, they were not to be allowed to interfere. The Padre would give any attention that might be necessary to the other aspect of the case. To anyone still holding this view I would commend a section of the "Manual on Venereal Diseases," written by Sir Alfred Keogh, and other officers of the Corps. The section I mean is the one on History and Prevention, and was written, I imagine, by Lieutenant-Colonel Melville. This section puts the whole matter much more clearly than I could, so I may be forgiven for referring to it. Anyone reading it could not fail to see that it is the duty of everyone responsible for the welfare of soldiers to endeavour, both by precept and example, to educate public opinion among them to a higher standard of morality on this point.

I think it is generally admitted that public opinion has changed for the better considerably among the men with regard to the

question of intemperance. The result is that there is considerably less drunkenness now than formerly. I think it is quite within the bounds of possibility that a similar change might be brought about with regard to the wholesale contraction of venereal disease.

I think a great deal is done now by many Commanding Officers and other regimental officers to encourage games and sport among the men, who are naturally fond of athletics of all kinds. This is certainly one way of turning their thoughts into healthier channels. I think it would be quite possible to further extend this idea. Another thing is that men are continually being lectured, nowadays, on every conceivable subject, from the comparative muzzle velocities of modern rifles to the variation of species among enteric microbes. One such lecture from time to time might possibly be devoted to pointing out to them that, however surprised they may be to hear it, incontinence is not absolutely necessary to health; at the same time some of the results likely to follow from constant exposure to this sort of infection might be mentioned to them.

I have no doubt that I shall be told that it is quite useless trying to influence men in this sort of way. Well, no doubt, so it is if you start with the above assumption that men will contract venereal disease to the extreme limit of their opportunities. But I think if soldiers are treated as thinking beings, quite as much alive to their moral responsibilities as civilians are, that a great deal may be done to induce them to avoid contracting these diseases. And I feel certain that in proportion as the specialist officer or anyone else interested in the soldier grasps this view of the case, and not the other, in so far he will be likely to succeed.

DISCUSSION.

Major C. E. Pollock opened the discussion by congratulating the lecturer on the excellent statistics for the Woolwich garrison during Major French's tour of duty as specialist in venereal diseases. Major French was, however, apparently very fortunate in being able to retain the services of the orderlies whom he had trained to carry out his ideas, as in so many stations it happened that as soon as the senior orderlies had thoroughly learnt the numerous details of the work their services were required in some other sphere of usefulness.

As regards the inunction treatment, Major Pollock criticised this from a Service point of view, on the grounds of expense, trouble, and involving a stay of forty-two days in hospital after a diagnosis of syphilis had been made. He also pointed out that, in the ordinary case of syphilis, gargles

were not necessary provided the teeth were kept clean. The value of arylarsenates as opposed to mercury in early cases had not, in the speaker's opinion, been established. In the old tertiary case with destructive lesions soamin had been of the greatest service, producing a rapid gain in body weight, together with disappearance of the symptoms. As regards irrigation in gonorrhœa cases, Major Pollock said that this form of treatment greatly reduced the acute stage, but was of little use in the sub-acute and chronic stages. He advocated measures to compel every man who had exposed himself to the risk of infection to report each morning during the following week. A microscopic examination of the meatal mucus which, with the aid of a trained orderly, only took a few minutes, would reveal the presence of gonococci long before the soldier had had time to make his own diagnosis, as he does at present. Irrigation treatment begun at this stage offered the prospect of a speedy cure. In the American navy a system of making the men report on return to their ships and immediately treating all those who have exposed themselves had been followed by most successful results. Of 256 men who had exposed themselves at various ports on the return journey from the East *via* Europe to America, not one developed any venereal disease (see *Military Surgeon*, August, 1909).

Major WARD congratulated Lieutenant-Colonel Wilson on the very interesting paper he had read, and referred to the value of such papers and the discussion which they provoked. Without them he thought we were apt to become more or less self-centred in one particular form of treatment, and to consider that no other was possible or could be right. He regretted that Lieutenant-Colonel Wilson had not given more details as to how the reduction in the incidence of venereal diseases at Woolwich had been attained, as personally he did not think the medical officer had much power in this matter. He also questioned the utility of making patients, who had been in hospital for gonorrhœa, attend for long periods after their discharge from hospital.

With regard to the complications of gonorrhœa, Major Ward stated that in his experience affections of the eye, such as ophthalmia or iritis, were extremely rare, and during the last four years there had not been a single case admitted to, or occurring in, the Rochester Row Hospital. Cases of gonorrhœal arthritis were also comparatively rare, and they often went for long periods without seeing a case. It generally occurred in the neglected cases. He also referred to the difficulty of differentiating between gonorrhœal arthritis and ordinary acute rheumatism, and mentioned a case which had just been admitted from the Metropolitan Asylums Board Hospital, where the patient had been suffering from scarlet fever, and was transferred to Rochester Row, as he was suffering from a urethral discharge; a few hours after admission the patient complained of feeling unwell, and had pain in the right knee; in the evening the temperature was 102° F., and the knee was acutely painful and swollen. On the follow-

ing day the patient was in great pain, and during the three following days the temperature ran about 100° F., with extension of the pain and swelling to the right shoulder and foot; on the fourth, fifth, and sixth days the temperature fell to between 100° F. to 101° F., while the pain and swelling in the joints first affected were much less, but the joints on the left side began to be involved. At the end of the week the temperature was normal and the patient was much better, but a few days after there were undoubted signs of commencing valvular mischief, which had increased since. The inference in this case was that the arthritis was rheumatic in origin, but if it were not for the valvular trouble the case undoubtedly would have been called one of gonorrhœal rheumatism. The treatment of these cases of gonorrhœal arthritis was most unsatisfactory, and they were most benefitted by hot-air baths given by means of the electric-thermo generator. The treatment by means of anti-gonococcus serum and vaccine or anti-streptococcus serum had not been a success, several cases having been treated with one or the other of these preparations. He was glad to see Captain Harrison present, who would be able to give the meeting more particulars, as he had investigated this treatment more fully. With regard to the success which Lieutenant-Colonel Wilson claimed for the "inunction method of treatment," Major Ward thought that it was very unfortunate that this subject had become such a contentious one among officers of the Corps interested in the treatment of syphilis; so much was this the case that they were practically divided into two classes—those in favour of the inunction method, and those in favour of the injection.

He considered that this was a most unfortunate position, and, without wishing for a moment to convey the idea that he would have all cases of syphilis in the Army treated by the same method, he believed that it would be very much better for all concerned, the patient as well as the medical officer, if one particular method of treatment were adopted, and he would suggest a meeting of those most interested in the subject in order to decide which form of treatment was the better. Under the present system it was very difficult to properly keep up the syphilis case-sheet when a patient was moved from a station where he had been treated by means of inunctions to another where he was treated by injection. It was also bad for the patient.

He thought that treatment by inunction was most undesirable in the Service for the following reasons: It takes a long time; it is a very dirty method; it is expensive, as it should be done by trained rubbers, who in the Service are granted sixpence a day extra duty pay; it is unsuited for hot or tropical countries, or where there are skin lesions; it is liable to cause a dermatitis or folliculitis. It was very desirable that something should be done to insure that those soldiers who were on the syphilis register at the time when they were due for transfer to the Reserve should continue under treatment. At present a large number

of men were going on to the Reserve suffering from syphilis, and the risks were very great that these men would become inefficient, and spread the disease in the towns or villages to which they go. In the London district an attempt was made to meet this difficulty by signing the man as fit on condition that he completed a course of treatment for syphilis. The man was asked for his new address and the case-sheet was forwarded to the nearest military hospital, and the man was ordered to report there as soon as he was able. This system worked very well for a time, but a certain proportion of the documents came back with the remark that the patient failed to attend for treatment, though he had been written to, and lately this number had very much increased.

Captain L. W. Harrison said: I have no claim to discuss the treatment of syphilis from a clinical point of view, as my clinical experience is so short, and one knows that the success or failure of this or that line of treatment is only decided, from a clinical point of view, many years after the date of the original sore. I should like to ask Lieutenant-Colonel Wilson how long he considers that a patient should remain under treatment for syphilis. As it is generally agreed that a positive reaction to the Wassermann test is an indication for continuing the treatment, I have made a detailed copy of the amount and duration of treatment which each patient has received whose blood serum I have tested for the Wassermann reaction. As regards cases which have been under treatment for two years or more, I have, so far, only collected thirty-one cases, but of these twenty-one have given a positive reaction, so that it would appear from this that two years is not sufficient. It would be interesting to know how many reservists become non-effective through reminders. I agree with Major Ward's remarks on the desirability of continuing the treatment of men after they have passed to the Reserve, and would like to see it made a condition of a syphilitic's retention on the Reserve that he continued to undergo the treatment until considered free from the disease. As regards the respective merits of inunction and injection I cannot say much, but, out of the thirty-one cases which I have mentioned eleven had been treated by a long course of inunctions at first, followed by injections of mercurial cream; eight of these gave a positive reaction. Thirteen cases had been treated by injections of mercurial cream only, and of these seven gave a positive reaction. As regards the question of the arylarsenates, I think it a pity that they are so generally considered from the point of view of arsenic versus mercury. I think it would be much better to consider them from the point of view of arsenic in conjunction with mercury. We know that trypanosomes become resistant to atoxyl—there are many points of analogy between trypanosomes and treponemata—and it is surely not a very wide stretch of imagination to think of the possibility of treponemata becoming mercury-fast. As regards the vaccine treatment of gonorrhœa, for a time I treated every alternate admission with vaccine, hoping to obtain in this way an

estimate of its value when used as an addition to the usual treatment. I cannot say that it shortened the stay in hospital nor the duration of the discharge, but it seems to have some effect in preventing complications. In cases of gonorrhœal rheumatism it certainly seems to do good.

Captain BRANSBURY said: (1) That the inunction method of administration of mercury was excellent in every way for in-patients, especially as the effects of the drug could be more easily controlled. Only recently a patient of his, suffering from syphilis, was being treated by the intramuscular injection method, using Lambkin's cream, and after he had had four 10-minim (gr. i. Hg) injections he suddenly developed alarming symptoms of mercurialism, and at one time it was thought he would lose all his teeth. These accidents should not occur with the inunction method. A part of the plan of treatment as carried out at Woolwich was that the patient should wear the same underclothing the whole time he was undergoing a course of inunctions. Major Pollock suggested that the patients must be odoriferous, but this had not been noticed.

(2) That the Wyndham Powell method for treating gonorrhœa had not given very good results, and that this was owing to the men reporting sick late—viz., after they had suffered from a discharge for several days.

(3) That it would be beneficial to the Service if the continuous system of treatment could be adopted for any women or children who might be sufferers from syphilis.

(4) That the present annual return of syphilis, rendered in accordance with Appendix VII. Army Medical Service Regulations, should be amended, and that recommended on pages 258 and 259 of "A Manual of Venereal Diseases," by Royal Army Medical Corps officers be adopted.

(5) That soldiers suffering from syphilis should not be sent to a tropical or malarious country till they had been under treatment for a year, or had received three full courses of mercury.

(6) That the medical history sheets and syphilis case-sheets of men on the syphilis register should be always kept together, and be in the possession of the specialistic officer. This would insure no man going to the Reserve, or leaving the station, or proceeding abroad without that officer's knowledge, and would also reduce the great amount of clerical work that arose in communicating with commanding officers concerning the men.

He asked when soldiers who had recently contracted syphilis, and who had only been treated for a short time, and who were due for the Reserve, should be considered as "fit for Reserve." Arrangements had been frequently made for these men to attend the Military Hospital near their homes to continue their treatment, but they invariably failed to report themselves.

Fleet-Surgeon CLAYTON said: I have no experience of the treatment of syphilis by intramuscular injection, as, in my comparatively limited experience on board ship, I have never found any difficulty in carrying

out continuous treatment by the old-fashioned method of administration by the mouth, occasionally aided by inunction, and even in the East Indies have always found the results satisfactory. There is one point of interest which I do not think has been referred to, and that is the effect of these various forms of treatment upon the recurrence of manifestations during the active stage of the disease. In my own experience of the old-fashioned method recurrences while under treatment were exceptional and not severe, but in my recent work, which involves the study of the nosological returns for the Navy, I have been impressed by the apparent frequency of severe recurrences, even during a course of treatment, under the new system of injection which is now so general in the Navy. I believe Captain Dorgan published a paper some time ago in the JOURNAL OF THE ROYAL ARMY MEDICAL CORPS in which he referred to this point, and stated that after a fairly extensive trial at Poona he had come to the conclusion that recurrences were more frequent with intramuscular injection treatment.

Clinical and other Notes.

THE SOLDIER'S VISION.

By Major D. J. COLLINS.
Royal Army Medical Corps.

Some years ago the writer ventured to submit a plea for an improved visual test for recruits, in which the inadequacy of the "dot" test was pointed out.[1] The dot at 10 feet corresponds to a 3-foot bull's eye at 600 yards; each dot being about three-sixteenths of an inch in diameter, and being read at a distance of 10 feet, is approximately equivalent to $\frac{6}{24}$ on Snellen's types. The old test lacked the advantage of taking into account the visual acuity of the person under examination, in the same way that Snellen's test does. By visual acuity or sharpness of vision is meant the power which the eye possesses of distinguishing the shape and form of objects: and it was found that a man with defective vision was able to count the dots at 10 feet, although their edges might appear to him hazy and indistinct, and he merely saw so many smudges on the card. In the same paper it was advocated that the vision of each eye should be recorded on the man's medical history sheet, thus constituting a permanent record of the condition of his refraction at the time of enlistment. The dot test has since been abolished, Snellen's types have been substituted, and the recruit's refraction on enlistment is entered on his medical history sheet, but there is still scope for further improvement which, it is submitted, can be carried out without any additional expense, and with much material benefit to the nation.

The standard we have adopted requires a minimum vision of $\frac{6}{24}$ on Snellen's scale, or one-quarter of normal vision; this is practically the same as the former standard, except that visual acuity is now taken into consideration. We also take a man with one-sixth of normal vision in one eye, provided he has full vision ($\frac{6}{6}$) in the other. From a military point of view, the vision of one eye only (the shooting eye) need be considered. Compared with the requirements of the regular services of foreign armies our standard is a low one.[2] The United States Army demands full normal vision; France, Germany, Austria, and Belgium require $\frac{6}{12}$; Italy and Japan $\frac{6}{18}$, as the minimum vision of the weaker eye. Switzerland and Belgium require that the right eye, in cases of anisometropia, shall have the better vision; while in the other countries enumerated no stipulation is made as to which is to be the better eye, and the soldier is permitted where necessary to shoot from the left shoulder. All foreign army regu-

[1] Journal of the Royal Army Medical Corps, vol. v., No. 6, 1905.
[2] *Archiv. de Med. et Ph. Mil.*, September, 1908.

lations dealing with defective vision, with the exception of the Italian, recommend the use of corrective lenses. As binocular vision is not necessary for good shooting, our object should be to get men with good sight in one eye, and where the vision is defective to correct it to normal, or as near the normal as possible with suitable glasses.

In our army we take a recruit who can read $\frac{6}{24}$ Snellen or better with each eye separately without glasses, we record his vision, and we do no more. The writer, however, submits that we should go a step further, and estimate accurately the refraction of every recruit whose vision is below normal, prescribe suitable glasses, supply them to the soldier on payment, and enter the correction on the medical history sheet, so as to avoid the necessity for a fresh examination by a specialist should the glasses become broken or lost. From the point of view of vision the army may be divided into (*a*) shooting corps, including the cavalry and infantry of the line and the gunners of artillery, and (*b*) non-shooting corps, comprising the drivers of artillery and of Army Service Corps, and the men of all departmental corps, who are not required to shoot on service. Men who with or without glasses cannot read $\frac{6}{6}$ on Snellen's types corresponding to full normal vision should not be permitted to serve in cavalry or infantry of the line where perfect vision is essential for good shooting, scouting, and signalling. Men with indifferent sight are not only of little offensive value in their own fighting line, but may be a source of potential danger to their own comrades. Such men (and the percentage who cannot be corrected with glasses will be very small) can be more profitably employed in other branches of the army, for example, in the departmental corps, or as drivers in the artillery or Army Service Corps. For shooting corps none but men with the best vision should be accepted. A recruit who is anxious to enlist will make every endeavour to see with the correcting glasses, whereas a man with twelve or eighteen months' service, who is tired of soldiering and whose vision to commence with has been defective, very often will not admit any improvement with glasses. Such a man will either have to remain as an encumbrance to his regiment and a source of perpetual worry to the musketry instructors, or will have to be invalided from the Service as medically unfit. Men with astigmatism should *ipso facto* be rejected for shooting corps; cylindrical glasses are expensive, often difficult to replace when broken, and it is doubtful whether a man with any marked degree of astigmatism can ever be made a good shot.

Myopia is permitted in all Continental armies, and the correction for it is prescribed in almost all except our own. Hypermetropia is recognised by the German, French, Austrian and Swedish armies, but the soldier is obliged to wear correcting lenses. The cost of ordinary spherical lenses is small, and the expense to the soldier would be a trifle.

Under the new musketry regulations soldiers will in future be classified from a shooting point of view, on the results of firing fifty rounds of

ammunition (instead of ninety-five as heretofore), fifteen of which have to be fired in the space of one minute. This minute is a critical period in a soldier's military career, as on it the award of his proficiency pay depends; and it is obvious that a man who is not in the possession of normal vision, either natural or artificial, will find it extremely difficult to qualify for his Service pay. As regards shooting from the left shoulder this new rapid practice becomes an impossibility for a man who through visual defect is obliged to shoot from his left shoulder, owing to the position of the magazine bolt on the right side of the rifle; every time the bolt is drawn the rifle will have to be shifted from the right to the left hand. The remedy for this condition of affairs would appear to be the issue to all shooting units of a proportion (say 1 per cent.) of left-handed rifles with the bolt on the left side.

In carrying out the details of the proposed innovation, it is not suggested that any additional work should be thrown on recruiting medical officers, beyond furnishing the specialist in ophthalmology of the district or command with particulars of all recruits whose vision is below normal. The ophthalmologist should then at regular intervals visit every depôt and examine the vision of such men, correcting them where possible to normal with suitable lenses, and recommending the transfer to departmental or non-shooting corps of astigmatics, and of others whose vision does not admit of full correction. This procedure may at first sight seem somewhat roundabout, but in reality it is considerably less so than our present system, whereby a recruit who reads $\frac{6}{24}$ or better is enlisted, provided he satisfies all other requirements. He is then sent to his unit, and after an interval of from three to twelve (in the case of recruits sent abroad without firing their course of musketry) months, he commences his musketry course. After the lapse of a further period, men who fail to shoot accurately are suspected by their instructors of having defective vision, and are then, and then only, sent to the eye specialist to have their vision fully tested and corrected.

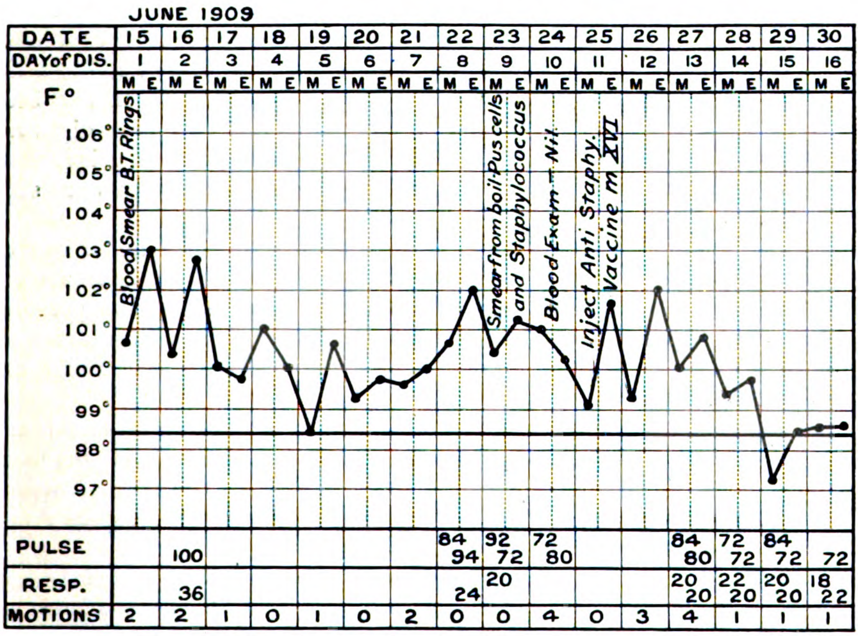
Recruits for the shooting corps, therefore, who do not possess normal vision should only be accepted conditionally on their passing a further sight test at the regimental depôt; and in the event of their not subsequently fulfilling the requirements they should have the option of transferring to a non-shooting corps. Until the adoption of some such measures as those indicated, the writer submits that the country is not receiving full value from its army.

MALARIA COMPLICATED BY DERMATITIS EXFOLIATA AND PYÆMIA; VACCINE TREATMENT; CURE.

By Captain A. L. OTWAY.
Royal Army Medical Corps.

Private A. B. was admited on June 15th, 1909, to the Section Hospital, Mhow, for malaria, and on his blood being examined benign tertian parasites were found.

Two days after admission a peculiar pink blush was noticed over the whole of his face, body, arms, and legs; this being most marked on his face and abdomen, no rash, however, could be detected. He had been given quinine since the time of his admission to hospital.



On the third day a fine scaly process of desquamation commenced on the soles of his feet and the palms of his hands, spreading later to his body and face. The flakes of desquamating epidermis increased in size, and eventually almost a complete cast of both soles exfoliated, leaving in places underneath small raw fissured surfaces; these were the only areas in which the flakes of desquamated epidermis were of a large size, over the remainder of his body, face, and limbs the fine scaly character persisted. Vaseline was at first used as a local application, but being found to dry too quickly, olive oil was substituted, and in addition any raw surfaces were protected by dressings.

About the seventh day it was noticed that there was a number of red

swollen points in the skin over his whole body and extremities. Many of these were of a papular form and had a tiny bead of pus in the centre, the remainder were red raised points with an indurated hyperæmic circumscribing zone and confined to no particular area.

On the eighth day it was noticed that some of the glands in his axillæ and groins were enlarged and suppurating; local fomentations were applied. The next day a smear was taken from the pus of one of the axillary glands and examined microscopically, large numbers of staphylococci were seen. The remaining glands in which pus formation was evident were incised and the pus evacuated. Several of the red swollen points mentioned above had by this time greatly increased in size and in several fluctuation could be obtained; these were accordingly incised and dealt with, some eight or ten being opened, all proving superficial and all healing up rapidly once they were drained of their contents.

On the eleventh day, as systemic infection was evident, I injected the patient that evening with anti-staphylococcus vaccine, which had been prepared at the Kasauli Institute. About ten o'clock the same night the patient complained of feeling ill and perspired freely, his condition, however, gave no cause for anxiety and was only temporary and soon improved.

The following morning the patient's temperature had fallen and he looked infinitely better, and he stated that he felt a great improvement in his condition, also his appetite, which had been bad on the previous day, now returned. At this time three more superficial absceses were opened and a considerable quantity of dark red blood-stained pus was evacuated from each.

The patient from now on continued to make steady improvement, and though I found it necessary to open some more superficial abscesses during the next few days no fresh ones formed after the dose of vaccine was given. No second dose of vaccine was considered necessary and the patient was allowed up after twelve days.

During the course of the disease a relative and differential blood-count was made for me in the Divisional Laboratory, which gave the following results:—

Red blood corpuscles	5,100,000
Leucocytes	20,000
Differential count—	
Polynuclears	90 per cent.
Large mononuclears	4 ,,
Small ,,	5·6 ,,
Eosinophiles	0·4 ,,

which shows a marked leucocytosis.

During the convalescence of the patient it was thought it would be interesting to see what agglutination results could be obtained from the patient's serum against the vaccine of staphylococci, so I took a

sample of his serum and sent it together with a capsule of the vaccine to the Divisional Laboratory, where a positive reaction was obtained with all dilutions up to 1 in 5,000; at 1 in 10,000 there was very slight, if any, reaction.

NOTES ON A CASE OF KALA-AZAR.

By Captain CHARLES WHITE.
Royal Army Medical Corps.

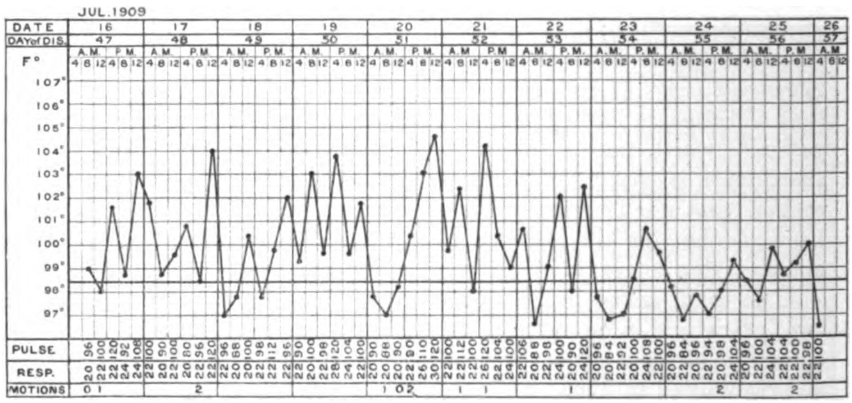
Number 32173 Bombdr. B., aged 25, was admitted to Station Hospital, Jalapahar (Darjeeling), on June 2nd, 1909. History of the case up to the date of his being admitted to the Station Hospital, Jalapahar:—

Patient first had fever in October, 1907, at Barrackpore, diagnosis being "ague"; notes on medical history sheet are: "Bilious remittent; excessive vomiting; hæmatemesis." The fact of this "bilious remittent" fever starting in October is important, as Major Rogers points out that European cases of kala-azar usually commence in the cold weather, and that infection is limited to this time of the year. A statement of the patient's worth noting in connection with the theory of the spread of the disease is that "the bed-bugs were very bad at Barrackpore, in fact, so bad that on Thursdays the men were put on special duty in the barrack-room for the purpose of washing the beds with carbolic, &c., and so trying to get rid of this plague of bugs."

The man landed in India, February 10th, 1905, so that he was only two years and nine months in India when attacked. For the first admission of fever patient was in hospital seventeen days, was discharged and readmitted in about six weeks with very severe vomiting (so severe that he was reported dangerously ill), was detained in hospital about seven weeks, was then discharged "to attend" and was all right for seven or eight months. At the beginning of August, 1908, he was again admitted with "malaria," was discharged, and admitted about two months later with symptoms of ptomaine poisoning. He had two or three more admissions for malaria, vomiting and diarrhœa. Patient left Barrackpore on November 18th for Barkacha Camp, was sent in from camp to Allahabad Station Hospital, again with fever and vomiting, remaining in hospital eight days, and then returned to camp. The Battery arrived at Cawnpore on March 1st, 1909; he kept "fit" till March 28th, when (an important fact) his nose bled profusely for an hour without any apparent cause. Next day he was admitted to hospital, again being diagnosed "malaria." From Cawnpore he was transferred to the Station Hospital here (Jalapahar).

Symptoms on admission to hospital (Jalapahar): High fever, but no mental dulness or delirium; cough with blood-stained expectoration; spleen greatly enlarged, extending to below navel; liver also enlarged, but

to less extent; very anæmic and debilitated, and complained of profuse nightly sweats, and pains in the limbs. Physical examination of chest revealed nothing. The microscopical examination of the sputum for tubercle bacilli proved negative—the sputum was examined on several different occasions, but tubercle bacilli were never found. Examination of blood specimens—slides for malaria parasites and blood capsule for Widal's reaction—also gave negative results; blood slides were taken on several different occasions, but malarial parasites were never present. Patient was put on a course of intramuscular injections of quinine but the irregular high fever still continued. The case did not respond to the three pathognomonic tests of malaria, viz., (1) pyrexial periodicity, (2) amenability to quinine, (3) presence of the hæmamœbæ of malaria in the blood.



The fever continued day after day. No malarial or other parasites were found in the blood, and repeated examinations for tuberculosis, liver abscess, and other septic conditions also proved negative.

These negative results suggested the probability of the case being one of the imperfectly known continued fevers, such as kala-azar.

The differential diagnosis between malarial cachexia and kala-azar is not always easy, as the history of this case shows; however, the long-continued irregular fever, the fact that quinine had no effect on the fever, the great weakness and progressive emaciation, all pointed to the case being one of kala-azar rather than malarial cachexia; also the temperature, which was now taken every four hours, showed a marked double rise; "the double remittent type of fever," noted by Rogers as being characteristic of kala-azar. (See temperature chart.)

Suspecting the case to be one of this disease, the liver was punctured in the mid-axillary line, the patient receiving 30 grains of calcium chloride immediately after the operation. Blood slides were made from the liver

blood and sent to Lieutenant Morison, I.M.S., at Kasauli, who very kindly stained and examined the films for me, and reported that in all of the slides sent Leishman-Donovan bodies were present; this was confirmed at Kasauli by Captain Christopher, I.M.S. Subsequent examination of blood films from the peripheral circulation showed the characteristic marked leucopenia, with low polynuclear and high proportion of lymphocytes and large mononuclears. No Leishman-Donovan bodies were found in the slides of the peripheral blood, though looked for on several occasions; but as the parasites of kala-azar when found in the peripheral circulation are almost invariably situated in the polynuclear leucocytes (being carried by them to the spleen, liver, and bone-marrow), they rarely can be detected in an ordinary slide of the peripheral blood, especially when the proportion of polynuclears is low.

The treatment subsequent to the finding of the parasites has been long continued full doses of quinine by mouth; this had to be discontinued occasionally on account of gastric trouble, but then I continued its administration by intramuscular injections. These long-continued and full doses of quinine certainly appear to keep down the fever, and to somewhat improve the general condition. However, the patient has been slowly getting weaker and more debilitated.

I think the chief points of interest are :—

(1) The case commencing in the cold weather at Barrackpore. I think there can be little doubt that the first entry for bilious remittent fever was really kala-azar infection.

(2) The fact of bed-bugs being present in the barrack-rooms, showing the probable channel through which this patient was infected.

(3) The fact that the man was only 29; two years in India when attacked. I believe it is stated by Rogers that the shortest time after arrival in India before attack is *eight* years, as, unlike malaria, kala-azar shows a predilection for the acclimatised—the natives and old residents.

(4) The slightness of general symptoms as compared with the high fever; the absence of any marked mental dulness and delirium, or of any urgent and distressing symptoms.

(5) The hæmorrhage from nose which might suggest the onset of enteric; and the hæmoptysis associated with fever and profuse diaphoresis which might very well make one think at first that the case was one of phthisis.

(6) The ease with which *early* kala-azar infection may be mistaken for malarial cachexia; however, in the later stages of the disease, the history, the great enlargement of the spleen, the double remittent type of fever, and leucopenia on peripheral blood examination, render the diagnosis easy.

REPORT ON THE CASE OF PENSIONER W. DU T., LATE DRUMMER PERMANENT STAFF 4TH BATTALION WEST YORKSHIRE REGIMENT.

By Captain F. W. LAMBELLE.
Royal Army Medical Corps.

The man was admitted to the Military Hospital, York, on January 11th, 1909, suffering from sarcoma of the left upper jaw. Operations for the removal of the growth were performed on January 12th and

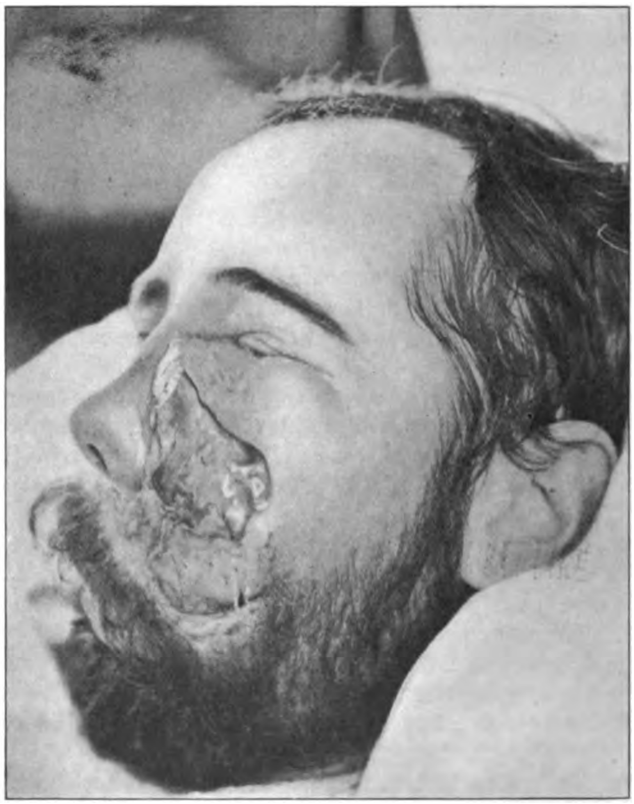


Fig. 1.—July 15th, 1909. Showing the gangrenous sloughing tumour *in situ*.

on March 2nd, 1909. A section of growth submitted to the Royal Army Medical College on March 2nd, 1909, was found to be a round-celled sarcoma. Recurrence occurred soon after the second operation; the

growth infiltrated the lymphatic glands of the face and extended by continuity of periosteum to the opposite alveolar process, and along the orbital plate and nasal process of the same side, when further operative treatment became impracticable.

After special request Squire's trypsin and amylopsin were supplied for the treatment of the case. On July 15th, 1909, all the recurrent growths

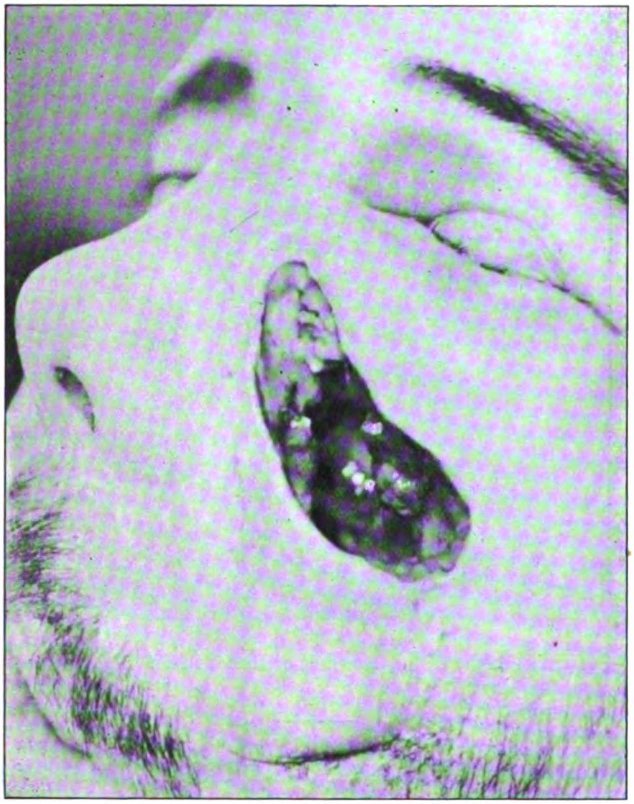


FIG. 2.—July 15th, 1909. Showing how the tumour has been cast off, the pultaceous slough having been lifted out *en masse* by dissecting forceps.

were necrotic, and were in process of being cast off, firm, healthy granulations being left behind.

The treatment was continued until September 15th, 1909, on which date the patient showed no sign whatever of malignant growth. All the necrotic tumour has now been cast off, and the mouth is clean and healed. The patient's general condition has also greatly improved—though he is

still debilitated from his long illness, and requires hospital treatment. A small plastic operation may be necessary to close the sinus in the cheek; this with nutritious dieting and massage will, I believe, complete his cure.

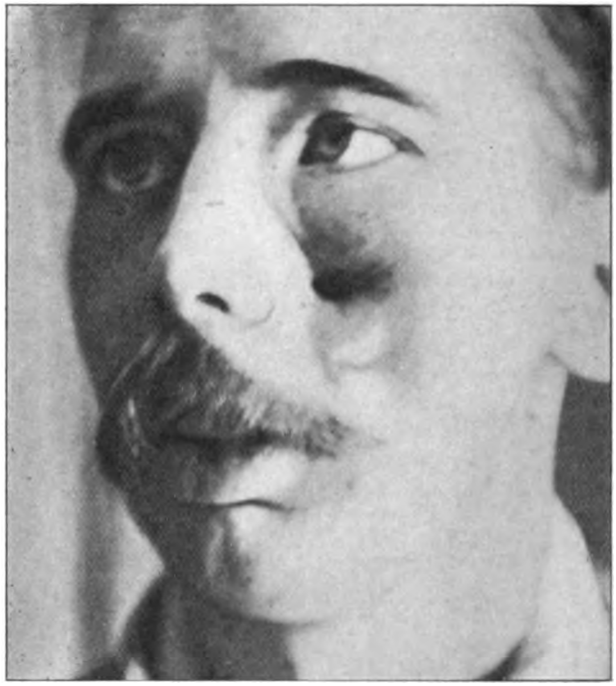


FIG. 3.—September 17th, 1909. No trace of tumour left. Parts soundly healed.

THE "LOUISE-MARGARET" HOSPITAL, ALDERSHOT.

BY MAJOR S. F. ST. D. GREEN.
Royal Army Medical Corps.

ON July 28th, 1909, H.R.H. the Duchess of Connaught, accompanied by the Duke of Connaught and the Princess Patricia, visited the Louise-Margaret Hospital at Aldershot, and opened the new operating theatre which has recently been built. Her Royal Highness has always, from the very first, taken a great interest in the Hospital, having laid the foundation stone in 1897, and opened it in 1898. Since that time, 5,490 women and children have been admitted for treatment; of whom 2,836 have been maternity cases and 2,654 general cases.

For a long time past, the need of a good operating room has been much felt, and the one which has just been built is really a fine building. The accompanying plan of the new operating theatre will give some idea of its nature and dimensions.

The walls are of carefully selected glazed bricks, cream-coloured below and white above, separated by one line of dark green bricks. The ceiling is perfectly flat and painted with a special white enamel paint. The floor is of terrazzo.

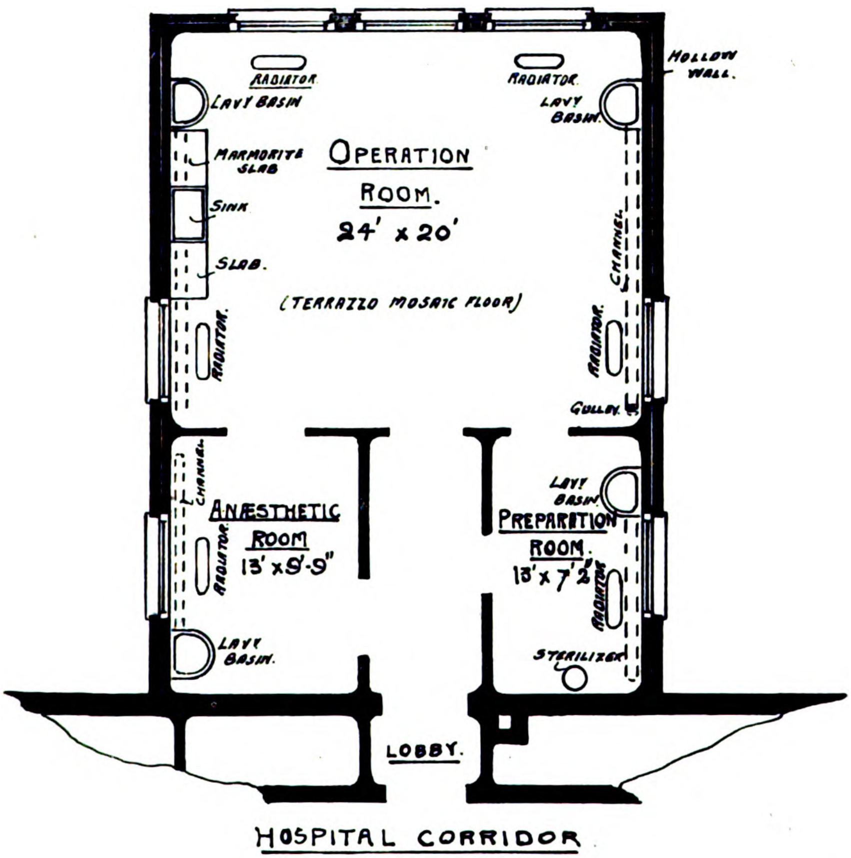


FIG. 1.

The method of lighting the operating room is quite a new departure, and is by means of "lino lights" (electric), fitted along the upper border of each wall. It promises to be a very great success and most effective,

giving a brilliant light with a minimum amount of shadow; further, the apparatus for these lights can be taken down with the greatest ease and very quickly, for the purpose of cleaning the walls of the room. Nothing whatever is suspended from the ceiling.

The basins and sinks have been supplied by Messrs. Doulton and Co., and are fitted with the latest kind of mixing valves for hot and cold water with elbow-action and sprays.

The Louise-Margaret Hospital is for the treatment of the wives and children of soldiers in the Aldershot Command, and contains fifty-five beds and twenty-five infant cots (swing).

The Hospital is arranged in two divisions :—

(*a*) The General Division, containing thirteen beds for women (one large ward containing ten beds, and one small ward containing three), fourteen beds and cots for children (one large ward of ten beds and cots, and one small ward of four cots).

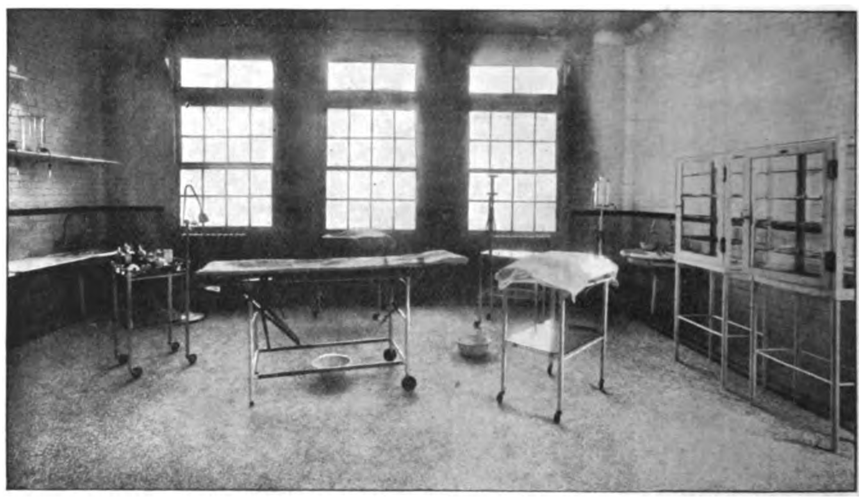


Fig. 2.—Operation Room.

(*b*) The Maternity Division, containing three labour wards (each one completely fitted with the necessary equipment for the management of labour, and containing one bed), and five lying-in wards (containing altogether twenty-five beds and twenty-five swing cots).

The nursing staff of the Hospital consists of the Lady Superintendent and fourteen nurses. Of the nurses, seven are permanent appointments, and the remaining seven, who have all received full training in general surgical and medical nursing before they come to the Hospital, give their

Fig. 3.—Large General Ward.

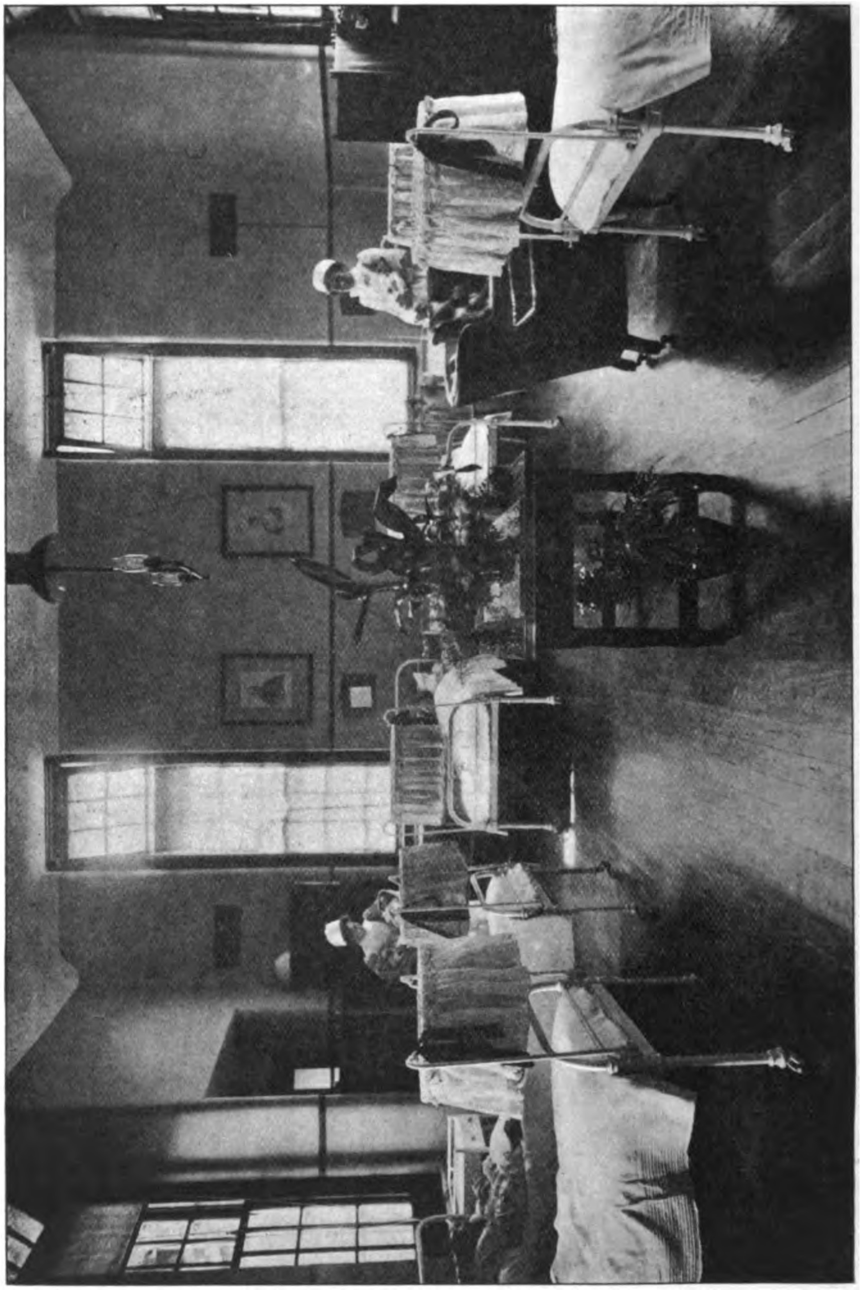


Fig. 4.—One of the Lying-in Wards.

services free in return for maternity training. The Hospital is recognised as a training school by the Central Midwives Board, and about twenty nurses are trained each year for the examination of that Board.

The Hospital practice affords ample variety, as will be seen by the short summary given below of the work done during 1908, when 788 patients were admitted for treatment (360 of these being maternity cases, and the rest general cases, women and children), and 202 surgical operations (major and minor) were performed under anæsthetics.

The outside work (that is to say, the outside treatment of officers, officers' families, and women and children) in North and South Camps, is carried out by three specially appointed Royal Army Medical Corps Officers directly in connection with the Louise-Margaret Hospital: One officer (at present Captain Lowsley, R.A.M.C., to whom I am indebted for valuable assistance in the surgical work of the Hospital) is in medical charge of the officers, officers' families, and wives and children of soldiers in Stanhope Lines, and also assists when necessary at the Louise-Margaret Hospital; Captain Mainprise is in medical charge of the officers, officers' families, and wives and children of soldiers in Wellington Lines; and Major Poe acts in the same capacity in Marlborough Lines (North Camp). This system, which was introduced by the present Director-General, works admirably. Each of the above-mentioned officers has held his appointment for three years continuously, and owing to the fixed nature of these appointments there is quite a feeling of content among the families of officers and soldiers because everyone concerned now knows who is his or her proper medical attendant.

Short Summary of the Work at the Louise-Margaret Hospital, Aldershot, during the Year 1908.

(1) There were 360 cases of parturition. Number of infants born, 367 (including eight sets of twin), amongst this number there were twelve still-births. One woman died; this was the result of collapse after placenta prævia. She had lost an excessive quantity of blood before she was hurried into hospital.

(2) For general diseases: 208 women and 220 children were admitted. (Total admissions during the year for both general cases and parturition, 788.)

(3) 327 women and children attended as out-patients for extraction of teeth under nitrous oxide gas.

(4) 202 surgical operations were performed, of which a summary is given below.

SUMMARY OF SURGICAL OPERATIONS.

Nature of Operation	Number of cases	Results: Successful	Results: Partially successful	Results: Failed	Results: Died	Remarks
Fifteen laparotomies:						
Excision of the vermiform appendix (in acute stage)	1	—	—	—	1	This child was admitted into hospital suffering from acute general peritonitis, the result of a gangrenous appendix
Operation for relieving intussusception	1	—	—	—	1	This child was sick for at least two days in quarters before being brought to hospital.
Cholecystostomy	1	1	—	—	—	
Exploratory laparotomy:						
(1) For pelvic abscess ..	1	—	—	—	1	
(2) For chronic ovaritis ..	1	1	—	—	—	
(3) Tubercular mesenteric glands	1	—	—	—	1	This case was thought to be malignant before operation.
Removal of Fallopian tube and ovary for:						
(1) Hæmatosalpinx ..	1	1	—	—	—	
(2) Pyosalpinx	1	1	—	—	—	
(3) Cyst of ovary and chronic salpingitis ..	1	1	—	—	—	
(4) Cyst of ovary	2	1	—	—	1	This was a case of multilocular cyst of the right ovary, and the patient was advised to come to hospital three months previously to have a cyst removed, but she deferred coming in sooner as she was told by a civil practitioner that she was pregnant. On admission patient was very ill, her abdomen being greatly distended and containing 39 pints of fluid; great omentum intensely inflamed, and bases of both lungs congested.
Four operations for ectopic gestation:						
(1) For ruptured tubal pregnancy	2	2	—	—	—	
(2) For tubal pregnancy, unruptured; left tube and ovary removed ..	1	1	—	—	—	
(3) Intra - ligamentous pregnancy	1	1	—	—	—	
Total laparotomies	15	10	—	—	5	
Operation for radical cure of hernia (modified Basini) ..	5	5	—	—	—	
Nephrotomy (for abscesses) ..	2	2	—	—	—	
Nephrolithotomy	1	1	—	—	—	
Circumcision (for phimosis) ..	47	47	—	—	—	
Excision of breast	1	1	—	—	—	
Excision of tumours (N, M, N, G)	2	2	—	—	—	
Enucleation of cyst (sebaceous)	2	2	—	—	—	

SUMMARY OF SURGICAL OPERATIONS—*continued.*

Nature of operation	Number of cases	Results: Successful	Results: Partially successful	Results: Failed	Results: Died	Remarks
Incision and drainage of abscesses	5	5	—	—	—	
Removal of foreign bodies from the tissues	2	2	—	—	—	
Erasion of glands	5	5	—	—	—	
Arthrectomy	1	—	1	—	—	
Erasion of joints	2	1	1	—	—	
Tenotomy	1	1	—	—	—	
Union of divided tendons ..	1	1	—	—	—	
Amputation of fingers ..	2	2	—	—	—	
Mastoid operations	3	2	—	—	1	
Removal of adenoid vegetations from the nasopharynx by curetting	36	36	—	—	—	
Removal of tonsils	26	26	—	—	—	
Abscess of breast incised and drained	6	6	—	—	—	
Plastic operation for congenital malformation ..	1	—	1	—	—	
Dilatation of cervical canal and internal os	3	3	—	—	—	
Curetting of the uterus ..	20	20	—	—	—	
Evacuation of the uterus ..	9	9	—	—	—	
Induction of premature labour:						
(1) In case of acute hepatitis, with profound jaundice and emaciated condition of patient	1	1	—	—	—	
(2) For placenta prævia ..	1	1	—	—	—	
Colporrhaphy for cystocele ..	1	1	—	—	—	
Total	201	192	3	—	6	

Report.

SANITARY REPORT: TRAINING AND MANŒUVRES, EASTERN COMMAND, 1909.

By Captain R. TILBURY BROWN.
Royal Army Medical Corps.

In submitting this Sanitary Report of the Eastern Command Training and Manœuvres, 1909, which took place during August and September, mostly in the County of Berkshire, and in the Vale of the White Horse, I wish to draw special attention to the marked and increasing improvement which has taken place in camp sanitation, to the interest shown in the subject by officers, especially of the higher ranks, and to the efficiency of the Regimental Sanitary Squads.

Training.

Selection of Camp Sites.—Before the troops went into standing camp, the site was selected from a tactical, and then from an engineer and sanitary point of view.

It was found that the water supply at the proposed camp was not sufficient for the whole Division, and consequently there had to be two camps; one at Churn for the 10th and 11th Infantry Brigades, four Brigades Artillery and the Divisional Troops, and one at Coldharbour for the 12th Infantry Brigade and one Brigade of Artillery.

The total number of men and horses at these camps was:—

	Churn	Coldharbour
Officers, N.C.O.'s, men	7,383	2,986
Horses	1,463	313

The water supply for the camps was of excellent quality and obtained from deep wells in the chalk. There was ample quantity at Coldharbour, but at Churn the amount was rather limited, owing to temporary causes, which, however, occasioned no serious inconvenience.

There is considerable waste of water in a camp, and it is suggested that one means of reducing this would be to diminish the *depth* of the washing basins. It is a common practice among the men to place a basin under a tap, and let it stand there until it is filled and the water is running over. The present basin holds much more water than is necessary.

Other means of diminishing the waste of water are:—

(1) Placing the taps away from the benches. This was done at Churn and found satisfactory.

(2) Allowing benches to be used only at certain hours.

(3) Policing the benches.

At both camps there was great difficulty in disposing of waste water, and this was due to the fact that there was a very shallow top soil which

overlaid a mixture of chalk and clay, or, in places, nearly pure chalk. The difficulty was overcome in the following way :—

(*a*) At *Churn*, a main 4-inch iron drain was laid in rear of the camping ground: this drain was closed at the far end, ran up and down over the irregular surface of the ground and emptied, at the other end, into a very old pit, which lay in a clump of trees and had trees growing in it. Junctions and valves were placed at several points along this drain. Each battalion and brigade had a large collecting pit for the waste water. A pulsometer steam pump, drawn by horses, was taken along the rear of the camp, and a short hose from it was dropped into the collecting pit which required emptying. A fatigue party connected up the pump to the nearest junction on the main drain, by means of a long hose, and the waste water in the collecting pit was pumped out and forced along the drain into the pit amongst the trees. The large pit rapidly absorbed the soapy water, from which there was never any offensive odour (see fig. 1).

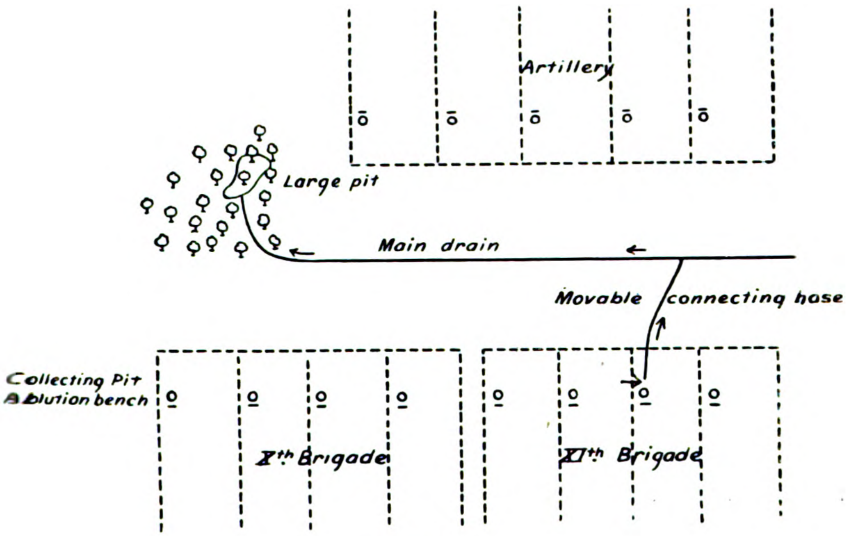


FIG. 1.

(*b*) At *Coldharbour*, the ablution benches were connected up by surface channels with a common pit from which the water was pumped by hand on to the surface of a ploughed field, about 100 yards from and 40 feet above the level of the pit. The water was distributed over different areas of the field day by day, and no collection of water occurred (see fig. 2).

When this method of disposal of waste water is employed the following points require attention :—

(1) The trenches and pit are dug by the regiments under supervision of the Royal Engineers, who mark the site in order to obtain the best gradient for the trenches, and calculate the required size of the pit. The surface channels should be as small and narrow as possible in order to obtain the best flushing, and should be covered in by the Royal Engineers where traffic over them is necessary.

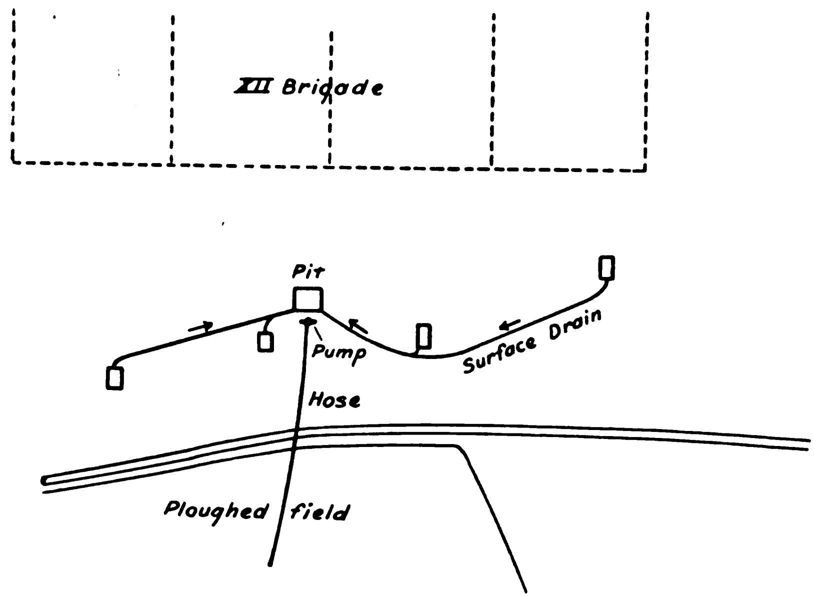


FIG. 2.

(2) There is always a large quantity of water about the pump, and a platform on which to stand and work it should be made by the Royal Engineers. The pump should be securely fixed to the platform, for if this is not done, there is difficulty in working the pump, and the surrounding ground becomes a quagmire, especially in wet weather.

By reference to fig. 3 it will be seen that there was a space of 20 yards from cookhouses, institutes and messes to the rear of the camp; in this space horses and wagons were allowed, but no "living tent," and the only tents on it were for bathing and clothes-drying. Thus, there was a well-ventilated space between cookhouses, &c., and the *sanitary area*, which was a separate area altogether, and lay behind this space.

The sanitary area was a space 20 yards deep, of the same length as the camp and situated directly behind it; the area was used for latrines, urinals, incinerators, and night urine pit.

The camp was not likely to be occupied for more than twenty-one

days, and the necessary depth of ground for shallow trenches for twenty-one days is 14 yards (21 × $\frac{2}{3}$). It was possible, however, to allot 20 yards for this purpose, as well as 20 yards for the erection of urinals, incinerators, &c., in rear of the camp (see fig. 3).

Arrangements made before Arrival of Troops.—I went down to the camp some days before the troops arrived, and being greatly assisted by the Company of Royal Engineers, was able to make much more satisfactory arrangements than would otherwise have been possible.

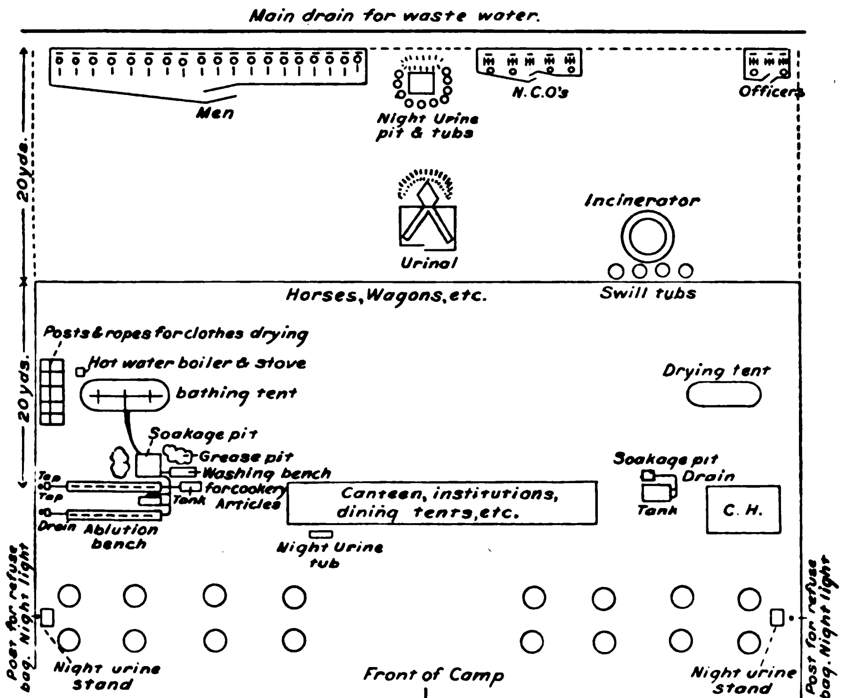


Fig. 3.

The boards of several civil infectious hospitals agreed to take cases if they should occur either during training or on manœuvres.

Several cases of scarlet fever having recently occurred in a village in the neighbourhood of one of the camps, it was put out of bounds.

The following order by the Commander-in-Chief, Eastern Command, was issued in the training and manœuvres orders :—

"The N.C.O. and at least half of the men of regimental sanitary squads will accompany the advance parties when their unit proceeds

to a fresh camping ground. They will be in addition to the actual strength of advance parties, and are only to be employed in sanitary work." This order very greatly assisted the sanitary arrangements.

Detailed sanitary instructions were issued by the General Officer Commanding 4th Division before the departure to camp. They included a rough plan showing the position of the latrines for each unit, and their positions were also indicated at the site by pegs marked "O," "N.C.O.," "M." By these means the advance sanitary squads were able to commence work at once, and much trouble and delay were avoided.

The only water-carts issued to all units were filter water-tanks. This proved a very satisfactory arrangement: the carts stood the work well.

The regimental water squads were composed of regimental men who had been through a course of instruction in the use of the filter-cart. They did their work well and took an interest in it, but it is thought that on active service the water squads ought to be trained Royal Army Medical Corps men or specially trained regimental men—trained not only in the mechanics of a filter-cart, but also in the multifarious duties connected with obtaining a pure or potable water. These duties cannot be taught in a short time, and it would seem to be a very difficult matter to keep a trained regimental squad always available. On the other hand, the number of Royal Army Medical Corps men who would be necessary for this duty alone would be enormous, and possibly not available on field service.

It might be possible to combine the two, for instance, one trained Royal Army Medical Corps man, and the rest of the squad regimental men. It would appear desirable that these trained Royal Army Medical Corps men should go through a revision course given by a medical officer, once a year, and then themselves instruct the regimental water squads. This would give them greater confidence and ensure a better knowledge of their work.

It has been suggested to me by an Ordnance officer, and it appears sound, that cookhouses should be prepared and covered by the Royal Engineers before troops arrive. At present the framework is erected by the Royal Engineers, and when the troops arrive the Army Ordnance Corps supply tarpaulin to scale, so that a small unit gets perhaps one tarpaulin which only goes half-way round. He also suggested that roofing felt might be cheaper and better than tarpaulin.

In Camp.—Nothing was buried and no refuse was removed by contractors. All indestructible refuse, *e.g.*, tins, glass, &c., after being burnt in the incinerators, was stacked at one of the three appointed sites in the camp; these sites were marked by boards, and thus there were no small heaps of rubbish about the camp. Ashes were also placed at these sites, but were generally used to scatter over the urine pits.

Tent refuse was collected in sacks or tent bags, which were hung on white-washed posts by the sides of the tent lines. These posts were used at night for lanterns, which marked the position of urine tubs.

Garbage was collected in tubs, which were covered, whitewashed, and placed on short posts. The best position was found to be away from the cookhouse and close to the incinerator. (See fig. 3.)

The chief difficulties in disposing of garbage were found to be: (1) excessive amount of waste food; (2) excessive wetness of refuse.

The excessive waste was more noticeable in some regiments than in others, and consisted of bread, potatoes, meat, &c. An attempt to locate the waste was made by giving separate tubs to companies, but the fault appeared to be general. By cutting down the money which men expended on extra food, a certain amount of improvement occurred. There was a very great waste of bread in one regiment where bread was issued in quantities per man, and not cut up for distribution as needed.

The excessive wetness of the refuse was due to liquid being put into the "swill tubs." This was stopped by making the cooks (the worst offenders) strain the contents of the tubs through sacking when too wet to go into the incinerator.

The refuse and garbage were burnt in incinerators built by each unit, and when this was done by trained sanitary men the result was good, but it took some time before untrained men were able to burn the wet refuse in wet weather.

The following points in the construction and working of incinerators may be useful: The incinerator must be built before troops arrive, one of the sanitary squad must be permanently in charge, care must be taken in starting the fire, in putting on the garbage little by little, and in damping down the fire at night. If the fire is not started early, and an excess of garbage is allowed to collect, it is very difficult to dispose of it.

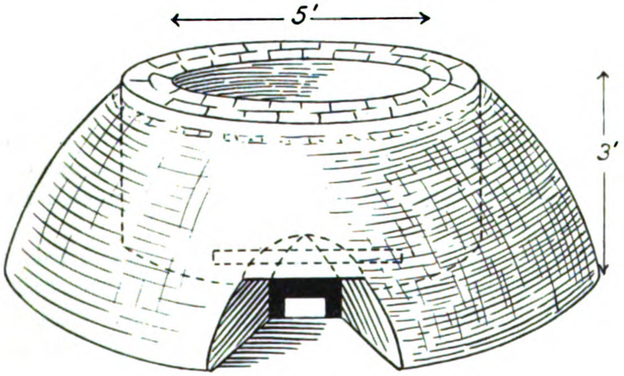


FIG. 4.

The simplest incinerator, and one of the best for large units, was a circular mound of sods, 3 feet high, and with an internal diameter of about 5 feet. (See fig. 4.)

This incinerator was built on the ground, with no internal excavation, and had four inlet holes. The sides of the mound were banked up with earth to give it greater stability, and to retain the heat. Had clay been available, the inside would have been puddled. Large stones were not available, so empty tins were stacked up on the bottom, the driest refuse, with a little wood, was placed over the tins and lighted, then a little wetter refuse, then dry, and so on in layers till the mass was well alight. The rest of the refuse, including tins, was now put on, a little at a time, until the evening, when the remainder was thrown on and allowed to smoulder all night. In the morning, a little wood was pushed into the part alight, the air inlet cleared and the driest camp refuse used to get the fire well going.

The chief points to be noted are: The refuse was heaped against the the side on which the wind was blowing; tins were not taken out as they helped to keep up the draught; the bottom ashes were not raked out until after about ten days, when the incinerator was nearly filled; and the contents were not raked about more than was absolutely necessary to get the fire up in the morning.

In this way the incinerator disposed of the whole of the refuse of its battalion during its fourteen days in camp. It never went out, and very little ash was taken out. When the camp was about to be evacuated, some paraffin oil and wood were added to aid combustion, and nothing was left but burnt tins and ashes, which were removed to the proper sites. The incinerator was broken up and the sods, of which it was made, were replaced as well as possible, so that there were very few signs of the place where it had stood.

When there was much rain, a couple of lengths of corrugated iron were laid over the top of the incinerator.

The general type of incinerator used was the one first described, but one regiment had a similar and circular incinerator, only 3 feet diameter. Tins were removed from it, and the burnt contents were raked out from the botton every morning and rubbed over a piece of corrugated iron which was perforated with coarse holes; the material which did not pass through the holes was reburnt, and the ash which passed through was disposed of as above.

For small units an incinerator made of corrugated iron was quite satisfactory for disposing of all refuse, and would be ample for a regiment when "swill tub" garbage is removed by contractors. Three lengths of corrugated iron were cut into 3-foot lengths, each length had a corner cut out, 8 inches by 8 inches, the three pieces were then bent and placed in a circle on the ground, slightly overlapping each other, and sods were piled well up all round them, but leaving three air inlet holes free. The lengths were then fastened together at the top by wire, and a layer of stones was placed at the bottom. If there was much rain, or the fire

required regulating, another piece of iron was placed more or less over the top. (See fig. 5.)

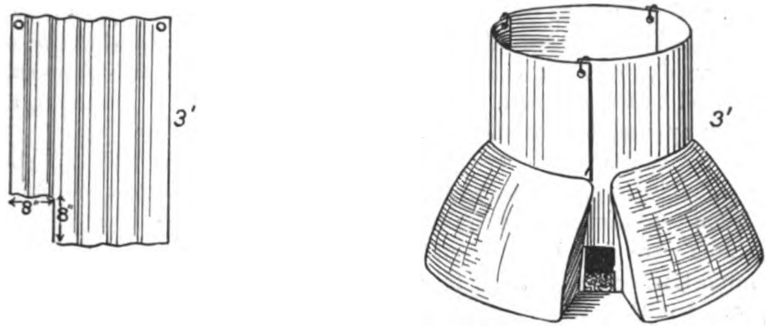


Fig. 5.

Only shallow trench latrines were dug; they were 1 foot deep and were filled in every morning. The amount of ground used for this purpose was remarkably small, and the formulæ: Hundreds of men × 6 = *frontage* required and days of occupation × $\frac{3}{8}$ = *depth* required (in yards), gave far more space than was required, or used, for actual trenching; but it gives a practical idea of the amount of sanitary area required, and makes allowances for bad ground, &c.

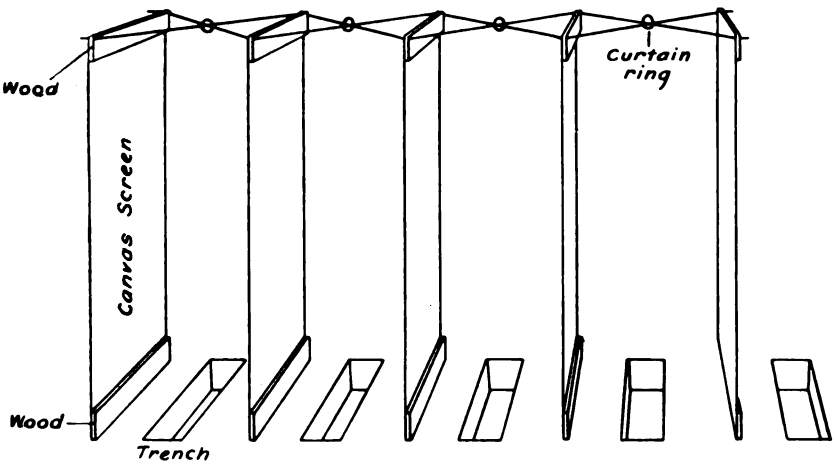


Fig. 6.

Three regiments adopted the suggestion made in the Sanitary Report on Eastern Command Training and Manœuvres, 1908, and had side screens for the trenches whilst in standing camp.

In one regiment the sanitary N.C.O. prepared an elaborate screen arrangement, which folded up into a small compass and was easily brought down to camp. It consisted of strips of canvas nailed to pieces of wood, and suspended by ropes which joined together the upper wooden strips, crossed and passed through curtain rings, being fixed at one end and tightened up at the other as required. There were also supporting posts placed half-way down. This arrangement appeared excellent, and was much appreciated by the men. (See fig. 6).

Two regiments had short pieces of canvas stretched between short posts, which were placed between every two or three trenches (see fig. 8). Some such partition is certainly of advantage in standing camps.

Urinals were dug in the usual manner and found quite satisfactory. It is important to make them fully 2 feet wide, and it helps to deodorise the ground if the sanitary man in charge sprinkles earth on the ground between the arms every morning when the troops leave camp, and sweeps it into the pit before they return; ashes may be used for this purpose. If urine stands in the pit, owing to slow soakage, more earth must be put in until no urine shows. Chalk was used for putting in the arms, large lumps being used. It is not so good as stones, which would have been used had they been procurable.

When gratings were provided for ablution benches and proper surface drains cut by the sanitary squad before the benches were used, the results were quite satisfactory; but when there were no gratings or the drainage was delayed, the ground got into a very bad condition.

One regiment had a separate bench upon which the cooking utensils, &c., were washed. It was constructed as suggested in the Sanitary Report on Eastern Command Training and Manœuvres, 1908, and was very satisfactory. It is regretted that more regiments did not try it. (See fig. 7.)

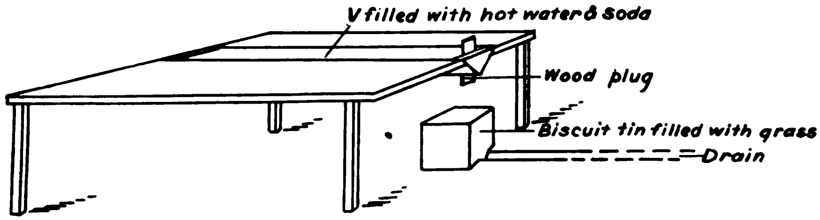


Fig. 7.

Most regiments had hot baths in marquees, which were arranged as described in previous reports. A simple way of arranging drains and baths is shown in fig. 8.

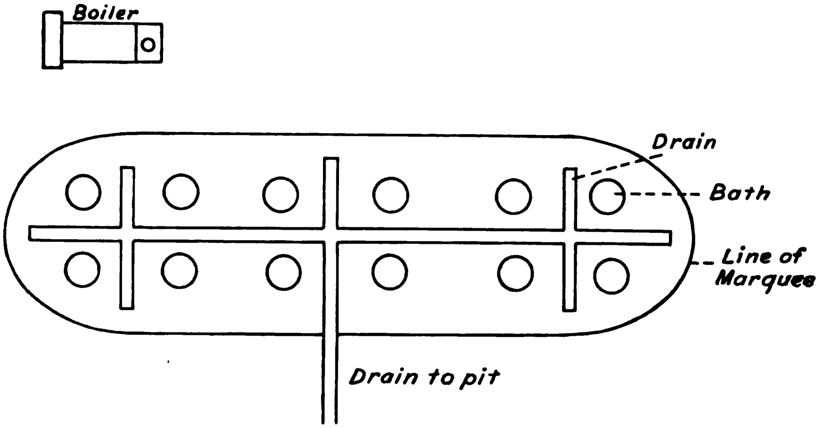
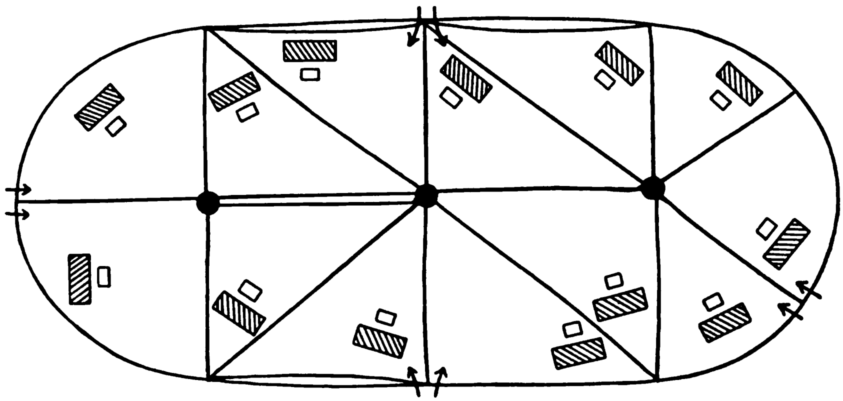


FIG. 8.

A more complicated way by which each bather is screened is shown in fig. 9.



13 Bathing spaces partitioned off by Hessian cloth.

= Seats *= Foot Rests*

= Poles

→ = Entrances hooked up when in use

FIG. 9.

One regiment made an extemporised shower-bath by suspending two large watering cans with roses, so that they could be tilted by pulling cords which were attached to each of them. Shower baths are not of

great general utility in the average English climate, and are not nearly as necessary as hot baths.

Several squads made improvised grease strainers by soldering a tin cone over a hole in the bottom of an "army" biscuit tin: two or three of these were placed side by side over a drain leading to the collection pit and the adjacent edges of the tins were kept together by a strip of tin which was folded so as to overlap them. (See fig. 10.)

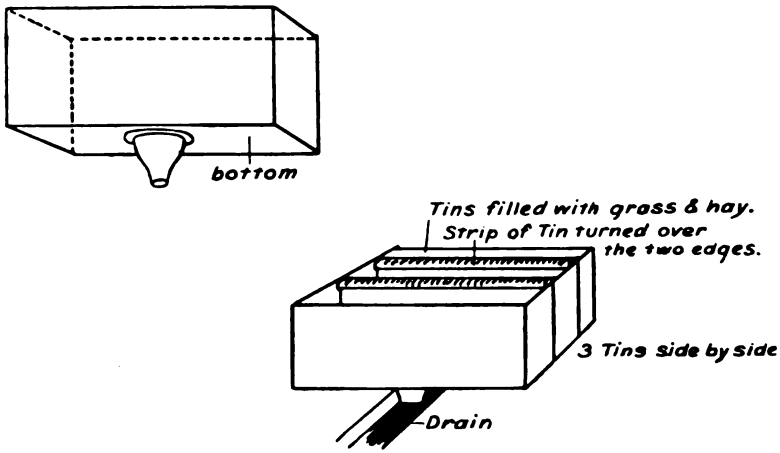


FIG. 10.

A small marquee in which men's clothes might be dried was allotted to each regiment, as well as two perforated buckets to act as braziers. The tent is certainly small if the whole regiment is out and the clothes get very wet, but from what has been seen carried out by some regiments it appears that the tent is most useful, and that the clothing can be dried very quickly if a systematic manner of working is devised, and if the tent is prepared before it is actually required. Some regiments have not tried it before, do not arrange the tent to the best advantage, have no routine way of working it, and on finding that their first attempt is a failure, are apt to condemn the tent as too small, or the heat as too little, &c., &c., and do not make serious endeavours to meet the difficulties.

When in camp there is difficulty in obtaining posts and ropes on which to dry the clothing in the tent, and it would be of advantage if six 7-foot posts, one 4-foot crossbar, and one 2-foot crossbar and 100 yards rope were allowed as an issue. These could be returned to store for subsequent use. Coke should be obtainable on Commanding Officer's certificate.

It is better to use a double tent as, although a single one gives more room, the double tent retains heat better.

The clothing should be distributed in the tent, which should be tightly closed all round, the ventilators being left open; the braziers should be got ready and the fuel made red hot by swinging them outside in the open; the braziers should then be put in the tent and the opening closed.

When replenishing the braziers, the entrance should be opened for a few minutes before a man enters, and he should be accompanied by a second man who watches him from outside in case he requires assistance through being overcome by the fumes. He should keep close to the ground, and get the braziers out of the tent as quickly as possible, then get the braziers ready again and replace them.

Before removing the clothing, the flies of the tent should be raised or let down at both ends for a little while. The braziers should stand across a trench which extends beyond the tent at either end.

Fig. 11 shows posts and ropes arranged so as to give a large amount of hanging area for clothes with good exposure to heat.

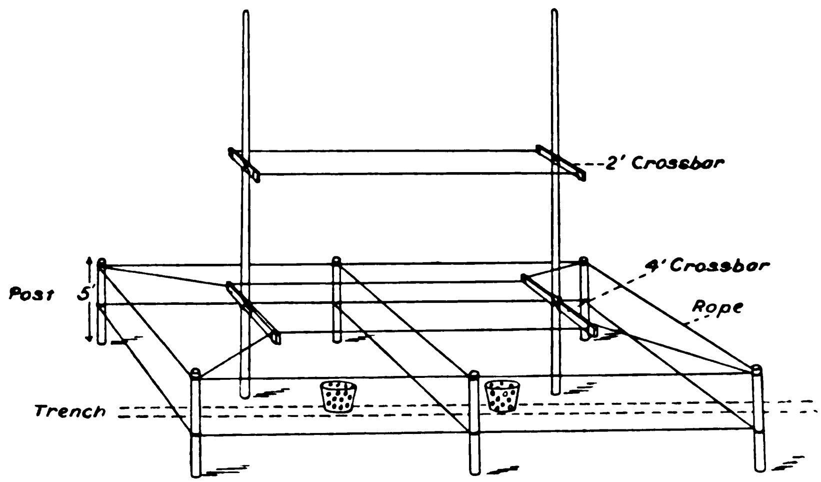


FIG. 11.

Diagrams were sent by five Commanding Officers showing the method of arranging posts and ropes. Several of them showed that the arrangements were very incomplete, and it is no wonder that difficulty was experienced in drying many clothes. The best methods were modifications of theabove figure, which appears to be the best. The difficulty, however, would have been to obtain the posts, crossbars, and rope.

Coffee-shops and Institutes were kept in an excellent condition, and were more carefully supervised than usual.

The "flies" of the marquees should be raised daily, the tables and

seats, which should be movable, taken outside and the ground swept, or it soon becomes soured as well as dusty. Dust can be easily laid, flies abolished, and a good surface formed by a daily sprinkling of equal parts of paraffin oil and water, applied with a common watering can which has a rose attached.

The health of the Troops was good. There were no cases of infectious disease, with the exception of two cases of enteric fever, one contracted the infection at his station before coming into camp at Churn, the other occurred at Coldharbour camp in a man who had recently arrived from Ireland. The cause of the disease was obscure.

There were remarkably few cases of diarrhœa and colic, and no outbreaks due to poisoning by food. This was largely due to the rigid exclusion of hawkers, and to the general cleanliness about cookhouses.

It is best not to have a number of contractors, for although there are advantages in competition, a large firm has much to lose, and it is more easy to control the food supplies when there is only one source. When a spell of hot weather came on, the largest firm in the camp, on their own responsibility, stopped the issue of fish and sausages, though they had a supply in hand which was wasted; this would probably not have been done by a smaller contractor.

There were very few days on which there was a large rainfall, but there was a small amount on many days. The weather was cold, especially at night and during the early morning.

Sanitary Squads.

I have nothing but the very highest praise for the infantry regimental sanitary squads, both individually and collectively. The N.C.O.'s and men knew their work and did it thoroughly; they showed common-sense when dealing with strange conditions, and there was a healthy rivalry amongst them which greatly helped towards efficiency.

As was the case last year, one regiment had a junior officer who supervised the work of the sanitary squad, was well read in the subject of military sanitation, and assisted the commanding officer in all matters appertaining thereto.

The artillery arrived without properly constituted sanitary squads, and had hardly a single trained man. This ought not to be, and unless the squads are a recognised part and parcel of every battery, sanitation will fall to pieces on service. It is true that the men told off for the duty did their work well after learning it, but this teaching should not be postponed till training and manœuvres commence.

Manœuvres.

It is suggested that after sites for temporary camps have been chosen and before manœuvres commence, any requiring special policing for protection of the water supply, &c., or special arrangements for supply

of water, &c., should be dealt with by the Assistant Quartermaster-General, the Royal Engineer officer, and the sanitary officer, and directions issued. For instance, at one camp, I happened to know that the water supply would be very liable to pollution by the troops, and went to it ahead of them. I found men were bathing close to the drinking water supply; police were not posted, horse troughs were placed by the edge of the water, and no trough was erected from which the filter-carts might fill their tanks, although they could not get to the supply.

It might possibly be of service if a small plan of every camp were issued, showing on it the position for latrines, horse troughs, &c., and giving any special instructions for Royal Engineers, provost marshal, brigade majors, &c., as the case might require.

The regimental sanitary squads did well, but it is regretted that there is a general tendency all round to belittle the importance of sanitation in bivouacs. One cannot expect ideal sanitation at the end of a day's fighting and when bivouacking, possibly on a wet night, but shallow trenches can be dug, rubbish can be buried, if not burnt, &c., and general fouling of ditches and hedgerows is not impossible to avoid. The very next day a regiment may have to bivouac on the same ground, or line the same ditch for hours.

When in temporary camps the sanitation by the infantry regiments was excellent, but as a general rule that of the other units left much to be desired.

Reviews.

SURGICAL ANÆSTHESIA. By H. Bellamy Gardner, M.R.C.S., L.R.C.P., London, former Anæsthetist and Instructor in Anæsthetics at Charing Cross Hospital; Anæsthetist to St. Mark's Hospital for Fistula, the National Orthopædic Hospital, &c. Baillière, Tindall and Cox. Crown 8vo. Pp. vii. and 240. Price 5s. net.

This handy volume begins with a short history of surgical anæsthesia, and although the book is small it will be found most useful to students and others desirous of studying the subject, for it treats succinctly with the whole matter, going, where necessary, into detail.

On p. 69 will be found a very true statement: "The extent of the physical examination of the patient before the administration of an anæsthetic should be in the inverse proportion to the administrator's experience." How often, alas! is the reverse seen in the case of those with small experience.

An excellent account of continuous anæsthesia under nitrous oxide and oxygen is given, and on pp. 139 to 146 is described the method of administering ether by the open method, of which the author is the chief exponent in this country; we think, however, that it cannot be recommended as a routine practice, but only in certain cases, *e.g.*, shock following accidents, in which condition a closed inhaler is contra-indicated, but ether is most suitable. A very ingenious method, devised by the author.

for giving chloroform by a tube terminal for use with Brüning's bronchoscope is given on p. 177. Those who consider chloroform the best anæsthetic for operations for adenoid growths should carefully study the remarks on pp. 198 and 199, in which the conclusions of Hinkel on the subject are given. An excellent account of how to administer anæsthetics for intra-nasal operations will be found in Chapter XVI.

On pp. 206 and 207 are given some useful points (not commonly observed) as to how best to obtain relaxation of the abdominal walls; the method, too, described by the writer of how to examine the corneal reflex is very worthy of note. C. B. L.

Studies in Tuberculosis. By Henry Clarke, M.A., M.D. London: A. Constable and Co., Ltd. Liverpool: At the University Press. Pp. 53. Price 5s. net.

A thesis on tuberculosis by one who is at the same time physician, pathologist and member of a city council, could hardly fail to be interesting, and Dr. Clarke gives us the advantage of his experience in all three capacities. He divides his book into three sections, viz., diagnosis, prevention and treatment. For diagnosis where the history, symptoms and physical signs are insufficient, he depends on the opsonic index, Calmette's or Von Pirquet's reaction, and, as a last resort, on the injection of old tuberculin. With regard to the opsonic index, his conclusions are that a persistent low index indicates localised tubercular infection; a persistently normal index does not exclude the diagnosis of tuberculosis, but makes it less probable, and a fluctuating index is diagnostic of tuberculosis with auto-inoculation. He considers the test with heated serum to be useless.

Of the local reactions, he prefers Von Pirquet's as being free from danger, and his conclusions are that patients who do not react are sometimes but rarely tuberculous, while patients who give a reaction must be regarded as tuberculous, though the tuberculosis may be quiescent or retrogressive. The inoculation of old tuberculin is confined to non-febrile cases, and the patient must be kept in bed till the tests are completed. The first dose is $\frac{1}{10000}$ c.cm. of old tuberculin; if that fails to produce a rise of temperature or local signs, double the dose is given on the third day, and if no reaction appears increasing doses of $\frac{1}{2000}$ cc., $\frac{1}{1000}$ cc., and so on up to $\frac{1}{100}$ cc. are given at intervals of two days. If any of the doses produces a rise of temperature of half a degree Fahrenheit, that dose should be repeated; if no reaction appears with any of these doses, and after the last dose of $\frac{1}{100}$ cc. has been repeated, the patient may be safely considered to be free from active tuberculosis. The author has seen no untoward results from these test injections.

In the matter of prevention the author points out the great practical difficulties that there are in the way of segregating tubercular patients, and of preventing the sale of tuberculous milk; but he considers that some reduction in the amount of man-to-man infection could be got by sanatorium treatment of early cases, and by segregation of those advanced cases which are so especially infectious, while for the reduction in the amount of tuberculous milk sold he would have the destruction of tubercular cattle tried in limited areas at first. The truth of this matter of milk infection seems to be that, unless the public can be got to see the dangers of tuberculous milk they will have to put up with the tuberculosis which results from swallowing it. In the section on treatment, the

author refers to the differences between the followers of Wright and the German school in the matter of the dosage of tuberculin, and one turned with interest to the results of his observations on the opsonic index of patients who had been treated with tuberculin in gradually increasing doses as recommended by Koch and his followers. It was disappointing to find, however, that the doses had been given by the mouth, although the author refers to them in other parts of his paper as "injections"; it is of course obvious that such results are in no way comparable with those obtained after administering tuberculin hypodermically, and Dr. Clarke's conclusions in this matter are by no means convincing.

The book ends with a section on "Literature," in which there is a new and interesting departure, instead of the bare reference there is given under each heading, a very brief *résumé* of the paper dealt with, the whole forming a short history of the recent work on tuberculosis. W. S. H.

Small-pox and Vaccination in British India. By Major S. P. James, I.M.S. Calcutta: Thacker, Spink and Co. 14 diagrams. Price Rs. 6., in England 7s. 6d. Pp. xi. and 105.

The author gives in the first place an account of the fearful ravages of small-pox in India in former days, and of the methods for mitigating it. He quotes an extremely interesting description by Holwell in 1767, of the methods of inoculation used by the Brahmins at that time, from which one gathers that they had attained to a very high degree of empirical knowledge concerning the attenuation of virus.

The prospective patient had to undergo an elaborate preliminary treatment, which had for its object the raising of his health. The virus employed was always that from inoculated cases and never from a naturally acquired disease, and it had been kept dry from the previous year. The skin at the site of inoculation was rubbed with a cloth for eight to ten minutes before the operation.

In the after-treatment the patient had to be kept in the open air throughout, and elaborate precautions were taken to avoid the spread of the disease from the inoculated to the healthy. For some reason or other the practice appears to have fallen into less careful hands in later years, with the natural result that the mortality following small-pox inoculation was enormous.

The history of the method by which vaccination was brought to India and the difficulties which were overcome is full of interest, especially as showing the immense importance which men, to whom small-pox was still a very real terror, attached to the new discovery.

Then follows the subsequent history of vaccination in India, and its effects in diminishing small-pox, spite of the fact that vaccination is by no means universal, and its application is greatly hindered by the prejudice and apathy which are only too familiar factors against sanitary progress in the East.

The figures and charts which Major James gives are another contribution to the polemic as to the efficacy of vaccination. They must have entailed immense labour, and one catches oneself wondering what good it all is. The plain man is already convinced that vaccination is a good thing and has been for long; the other, the "antibody," suffers from some mental warp which will forever prevent him from seeing things as ordinary people see them. He has the sort of mind that runs towards freak diets and fancy religions, and to him facts and figures only serve as

a stimulus to his unlimited capacity for fantastic juggling. Perhaps, however, there are others who need to be protected from the spurious cleverness of the congenital "antibody," and for them such statistics as Major James reports should be useful. W. S. H.

THE FIELD-AMBULANCE GUIDE. By Captain G. H. Painton. W. Clowes and Sons, Ltd., 1909. Pp. 109. Price 2s. 6d.

This is an excellent little book for the pocket, compiled by Quartermaster and Honorary Captain G. H. Painton, R.A.M.C.

It contains in concise and handy form not only a complete list of the medical, surgical and ordnance equipment of a field ambulance, with exact information as to where each article is packed and carried, the scale per section, the weight, and the price, but also many useful notes on nearly every article and subject concerned in a field ambulance.

The principal feature of the book is its arrangement. Each page is lettered alphabetically at the top; the first few pages of each letter give lists of the ordnance and other stores, and particulars of the weight, scale, packing, &c.; then follow the contents of the medical and surgical panniers, &c., commencing with the same letter; last come notes on the stores and other subjects with the same initial. Thus, on the first few pages lettered "C" one finds all the equipment with names commencing with that letter, *e.g.*, "Collars, head (spare)," "Clippers, hair," &c., then a list of all the contents of medical and surgical panniers which commence with "C," such as "Chloroform," "Catgut, sterilised," and so on, while the notes on the last two pages of the letter are on such subjects commencing with "C," as "Carts, water, filter tank," and "Camp, refuse, disposal of." If one wants to find out quickly how many "Flags, distinguishing, cross-bar" are allowed, and in which vehicle they are carried, one turns up "F" and sees that one flag is allowed per section and is carried in the forage cart; one also finds a reference to p. 41, with details of how to arrange the bars and ropes which carry the lanterns when these replace the flag at night.

The book is altogether most handy, and should prove very useful, not only on active service, but in camps of instruction, or on manœuvres, when there might be a doubt where a particular article is to be found among the numerous packages, or how many of a certain article there is in the unit. The book is arranged for the Territorial Force as well as for a Regular unit.

The reference in the general remarks to the attachment of a field ambulance to a brigade, might, however, lead to misconception were it taken to mean that such is the normal organisation. E. T. F. B.

HOW TO KEEP "FIT," OR THE SOLDIER'S GUIDE TO HEALTH IN FIELD, CAMP, AND QUARTERS. Compiled by Surgeon-Major H. Waite, Medical Officer in Command, Northern Telegraph Companies R.E. (T.). Second Edition revised. Pp. 60. Price 3d. Published by Gale and Polden, Ltd., Aldershot.

This little brochure is a *multum in parvo*, written in plain and simple language. Its perusal should help the soldier to that necessary state of "fitness" in health which must be the condition of every efficient fighting man. The headings dealt with are varied; many practical tips are contained in its small 50 pages. We wish it every success in its object.

E. C. H.

Current Literature.

Etudes sur le Service de Santé en Campagne.—In the *Journal des Sciences Militaires* of August 15th, 1909, Dr. A. H. Follenfant, *Médecin Principal de 2me Classe*, has written a first article on the Army Medical Services in the field. Dr. Follenfant, who was attached to the Russian Army in Manchuria, had excellent opportunities for seeing the medical services at work immediately after a great battle, and in this article which deals with the "exodus," as he terms it, of the less severely wounded he points out that the problem of collecting, dressing, and conveying the wounded from the field of battle to the field ambulance and field hospitals has been profoundly modified as a result of the introduction of first field dressings and the small-bore bullet. The first field dressing enables the soldier or his comrade to apply his own dressing, thus obviating the necessity of going to a dressing station to be attended to by a surgeon. The small-bore bullet, provided it does not injure vital organs or long bones, produces little pain or shock during the twenty-four hours immediately following the wound. As a result, the author estimates that 50 per cent. of the total wounded will, in future battles, be able to make their own way to the field ambulances or even clearing hospitals up to a distance of 6 or 8 miles. Another 25 per cent. of the total wounded if relieved of their equipment and helped by a stretcher-bearer, or even with the aid of a stick, will be able to walk a mile or two; carriage will only be necessary for the remaining 25 per cent. But twenty-four hours after the wound has been inflicted, only 75 per cent. of the original will be able to continue the journey on foot. In support of these statements he quotes the following experience:—

In 1885, Dr. Follenfant was placed in medical charge of a convoy of 190 wounded in Cochin China, which started immediately after a fight from Port de Chine to proceed to Langson, 25 kilometres distant. His sole transport consisted of eighty stretchers carried by hand, but in spite of this his convoy marched so rapidly that even experienced military officers were astonished. Four days after its arrival only half of the 110 who went on foot were able to continue their march.

Dr. Follenfant then quotes *Stabsarzt* Schæfer, who was attached to Kuropatkin's army, and who in a lecture at Berlin in February, 1907, made the following statement: "The number of wounded who require to be carried is usually exaggerated; more than two-thirds of the total number are well able to walk without doing themselves any injury and as a matter of fact a fair number of the wounded whom it would be advisable to carry do actually make their own way back to the field ambulance."

Stabsarzt Schæfer examined 7,631 wounded who had recovered and returned to duty. Of this number 5,425 were wounds of skin and soft parts only, and it might fairly be estimated that 90 per cent., or say 4,883 men, would have been able to walk back to the hospitals; in addition to these another 619 were wounds of small bones or joints and could also have walked; that is to say, that out of 7,631 wounded men only 2,129 men would have required carriage. This estimate is somewhat too favourable, as it does not include the seriously wounded who had died or remained in hospital.

Again, from January 28th, 1904, to January 1st, 1905, there were

treated in the Russian military hospitals of the Kharbin district 19,074 wounded. Of these 12,798 belonged to one of the following classes: (1) Wounds limited to soft parts not involving large blood-vessels, nerves, viscera, or special senses; (2) fractures of the small bones of wrist and hand; (3) wounds penetrating the smaller joints of the hand and fingers. These figures only include cases of a sufficiently serious nature to be transported to the stationary hospitals in rear of the area of operations, and therefore the proportion fit to walk is not as high as it would have been if all the wounded were included.

Schæfer collected 705 cases of wounds involving the viscera, larger blood-vessels or nerves, or producing fracture of long bones, and found that 399 of these were able to walk a portion or even the whole of the distance to hospital.

The Japanese foresaw these conditions and provided, as a part of the regimental medical equipment, walking-sticks and crutches to assist the lightly wounded in their "auto-evacuation" from the battle-field.

If the classification of wounded officially laid down (in the French Regulations), viz.: 30 per cent. lying down, 30 per cent. sitting, 25 per cent. walking and 15 per cent. unfit for removal were correct, what would have happened to the 110,000 wounded at Mukden who would have been left exposed to extreme cold? Both armies had their field ambulances 2 to 3 kilometres behind the firing line and the field hospitals were from 8 to 15 kilometres further back still. The successful evacuation of wounded from the battle-field must be largely attributed to this "auto-evacuation" of less seriously wounded.

(Dr. Follenfant omits, however, to mention the rapidity of evacuation effected by the Russian light field railways from the firing positions; while, in the case of the Japanese, evacuation was not sc urgent, as field hospitals came up to where the wounded were collected).

Among the Russians a large number of these less severely wounded purposely avoided the dressing stations and made their way directly to the stationary field hospitals or even got into railway trains. This statement is borne out by the fact that the Field Ambulances of the 1st, 3rd, 6th and 9th Siberian divisions only admitted 9,856 wounded, whereas these units reported a loss of 29,973 wounded (not including missing); some of the wounded may have been admitted into the field ambulances of other divisions; still it is fair to conclude that the bulk of these 20,000 wounded managed to transport themselves somewhat rapidly to the rear.

This exodus raises another point, viz., the disciplinary control of the lightly wounded. The Russian "*Feldscher*" had little authority over the men, but in the Japanese army no man was allowed to leave the ranks without the surgeon's permission. In the Russian Army few instances occurred of wounded men leaving the ranks unnecessarily. The greatest trouble experienced was from uninjured men volunteering to accompany wounded men to the rear; this practice really concerns the regimental officer.

As to the control of the movements of lightly wounded men this must be carried out by the Army Medical Officer, and it can only be done effectively at two points. The first is immediately in rear of the unit when the man first falls out, the second is at the point for which the man naturally makes, and this may be where a group of field ambulances are pitched, or a clearing hospital, or the nearest point on the railway

from which the trains start for the rear. Between these two situations everyone is too busy to bother about looking after stragglers. The first point must be dealt with by the regimental Medical Officer, who should order trivial cases to return to the ranks. In operation orders the positions of field ambulances, dressing stations and clearing hospitals should be made known to every unit before the action commences. The authorities at the central group of hospitals or clearing hospital must have their arrangements already completed before the crowd of lightly wounded begins to arrive, otherwise hopeless confusion must result, as each man is anxious to be attended to at once and all are hungry and depressed. Experience led the Russians to form a refreshment station at their clearing hospitals. Tables were laid in order and a plentiful supply of hot food was got ready. The comforting effect of a good meal did much to allay the somewhat natural nervous tension, and gave the medical authorities time in which to select those cases requiring immediate attention or admission to hospital, while the less serious cases could be packed into trains and sent off to the rear.

In future battles taking place close to a railway it would be highly advisable to establish a section of a clearing hospital[1] as near the fighting line as possible. All lightly wounded not requiring immediate attention could then be loaded into improvised trains and sent off to the general hospitals in the rear. This would greatly reduce the work of advanced medical units and give them time to attend properly to the seriously wounded.

Two factors still remain which must cause delay in evacuating the wounded after a battle: one is the excessive amount of administrative work in connection with each wounded man, and the other is the necessity for collecting his arms and equipment. As the man may shortly return to duty his arms and equipment must accompany him, while at the same time the progress of a wounded man is greatly facilitated by being relieved of this burden. Dr. Follenfant suggests that a certain number of wagons should be sent to a "rendezvous" as near the fighting line as possible, for the sole purpose of collecting arms and equipment of lightly wounded men proceeding on foot to the rear. C. E. P.

Etudes sur le Service de Santé en Campagne. By Dr. Follenfant (Second Article).—In the *Journal des Sciences Militaires* for September 1st, 1909, Dr. Follenfant has a second article dealing with the removal of the wounded from the battlefield. He lays great stress on the importance of keeping the regimental stretcher-bearers in close touch with their unit, and not attempting to control their movements from any point in the rear of the force. By advancing with their units these bearers learn the inequalities of the ground, dangerous portions, &c.—and can take advantage of this knowledge when carrying a wounded man to the rear. It is less trying for them to advance with their units than to make their way up to the firing line when alone.

Dr. Follenfant states that neither regimental officers nor surgeons can really select the most suitable "rendezvous" for wounded; the wounded themselves either by instinct or chance select their own rallying point; some make for the roads, some for woods or natural depressions, others try to reach dressing stations marked by the Red Cross flag.

[1] The French clearing hospital is always at rail-head, and this means that the ambulance trains should be brought as near the fighting line as possible.

The Russian medical officers kept watch on the wagon routes, and a good deal of their energy was more beneficially employed in hurrying up the transport than in attempting to render detailed surgical aid.

Dr. Follenfant again emphasises the fact that nowadays battles are not the short sharp actions of a few years ago, resulting in one side gaining the victory in a few hours and leaving the medical *personnel* to peacefully attend to the thousands of wounded. Future battles may continue for days hence, the collection and removal of wounded must begin at once and continue without interruption till all the work has been completed.

Shell fire is very terrifying at first, but one soon becomes accustomed to it; rifle fire is much more irritating; machine gun fire while it lasts produces a sensation of helplessness akin to that caused by an earthquake. A bearer's knapsack, if well filled, affords considerable protection from shrapnel fire.

Medical Tactics.—Stretcher squads must be trained to take the utmos advantage of all natural cover, never to expose themselves unnecessarily, and, if in the area of artillery fire, always to proceed singly, as a group of stretchers invariably attracts the enemy's attention. Japanese shrapnel, when exploding, was only dangerous over an area of about 100 yards by 20 yards; by noting where the shells were exploding it was often possible for Russian stretcher squads to pass safely through this zone of fire. Stretchers must be got close up to the firing line in order to take advantage of any lull. No one knows when the fire will slacken or for how long; unless ready to take advantage of it, the chance of doing so will most probably be lost.

Night work is difficult and slow. The bearers cannot see obstacles, so cannot step out quickly; landmarks are lost; supplies and reinforcements are being hurried up to the front, blocking the paths and causing confusion; the brassard cannot be seen and affords no protection. Night is the favourite time for decisive movements, either of attack or retreat.

Dr. Follenfant says that all wounded must be removed from the battlefield; it is only after arrival in hospital that the question of fitness for transport—*i.e.*, for "evacuation"—arises.

Defensive actions are the most favourable for the medical service, as the ground remains unchanged, and the hospitals and evacuation service can be properly organised. C. E. P.

Etudes sur le Service de Santé en Campagne.—In the *Journal des Sciences Militaires* of November 1st, 1909, Dr. Follenfant continues his series of articles on the working of the army medical services in war. In this paper he discusses the functions of the regimental aid-post and the arrangements for transporting wounded from the field of battle.

The regimental aid-post receives the severely wounded, brought on stretchers by the regimental stretcher-bearers, and those wounded who become exhausted while making their own way to the rear.

Regimental aid-posts must necessarily be formed within the zone of artillery fire; it is therefore esssential to prevent the formation of anything approaching a crowd, as any gathering of persons, *e.g.*, bearers and wounded, would almost certainly attract artillery fire and so lead to more casualties. The wounded should therefore not be closely grouped together, but spread out, preferably parallel to the fighting line. Every advantage should be taken of cover, especially with a view to screening

the position from the enemy. As few packages as possible should be opened so that the position can be rapidly changed if necessary.

The regimental medical officer must endeavour to make himself acquainted with the battalion orders and then make his own arrangements to suit the regimental movements. It is worse than useless for him to await orders from the administrative medical officer, who cannot possibly be thoroughly acquainted with local conditions. At the beginning of the war the Russian medical officers were much handicapped by waiting for orders which were frequently inapplicable when received.

As regards medical or surgical treatment at the regimental aid-post, the surgeon should only attempt to do what is absolutely necessary, such as administering some restorative in case of faintness, or the re adjustment of splints or bandages when these have become so loose or displaced that the man cannot safely be sent on without some attention. The all-important duty which devolves on the regimental surgeon in charge of the aid-post is to expedite the transport of wounded to the rear, and one of his greatest difficulties will be to make the best use of his different means of transport, *i.e.*, cacolets, wheeled stretchers, light ambulance carts, and heavy ambulance wagons, according to the nature of the ground which intervenes between the aid-post and the field ambulance. A regiment may be expected to have a fighting frontage of about 2,000 yards, so that at least some of the aid-posts are pretty certain to be situated at a little distance from a road.

The ambulance wagons should be retained for use on the roads, but the light ambulance carts may be sent across fields or along tracks, while cacolets can be used if any very rough ground has to be traversed. Carriage by hand must be economised, as otherwise the bearers will be exhausted long before their task is finished. C. E. P.

Etudes sur le Service de Santé en Campagne.—In the *Journal des Sciences Militaires* of December 15th, 1909, Dr. Follenfant has a final article on the "Characteristics of the Battle of Mukden: The Work of the Field Ambulance—should it become a simple Transport Unit?"

The salient features of the battle of Mukden were:—

(*a*) The protracted nature of the military operations.

(*b*) The use of the railway on the field of battle.

(*c*) The infrequency of hand-to-hand fighting.

(*d*) The distribution of casualties over many days and among units widely apart.

(*e*) The temporary security of the area in rear of the fighting line.

Even when allowance is made for the time and area over which they were distributed, the enormous number of casualties (about 110,000 among the 700,000 men composing the two armies) which had to be attended to, shows what an intense and prolonged effort was demanded of the medical services; yet this task, the magnitude of which was undreamt of in former times, never on any one day attained the intensity of the pressure on the medical services as after the battles of Gravelotte and Sedan.

In any similar battle in Europe it is obvious that the problem of sheltering wounded will be most difficult if not impossible to solve. Villages and isolated houses if not converted into temporary fortifications will be seized for billeting troops. The Red Cross flag cannot be distinguished at a greater distance than 2½ miles, and every village or collection of buildings is certain to become a target for the enemy's artillery. If the beaten side has established its hospitals in villages,

they must expect these to be shelled as the enemy advances; the conquerors cannot rely on finding anything beyond ruined or, at best, pillaged dwellings, unable to provide anything for the improvisation of a hospital. Although conditions in Manchuria are more favourable than they would be in Europe, both Japanese and Russians were forced to abandon the improvisation of hospitals near the fighting zone, and to direct all their energies to removing the wounded to the rear as rapidly as possible.

Improvised hospitals were necessarily made use of, but could not be placed nearer the fighting line than twenty-five miles. Experience showed how correct was the former definition of a field ambulance, viz., an institution for "packing and despatching." As an actual fact, the combatants in Manchuria could hardly ever convert their field ambulances into stationary hospitals for the treatment of sick and wounded. The Russian divisional field ambulances were lavishly equipped with surgical material and had specialist surgeons on their staff; in spite of this they gave up all operative work at the front except in cases of extreme urgency. The conditions necessary for major operations could not be obtained in the field hospitals of either side. The field ambulance is really a reserve for the regimental dressing station (*poste de secours*), to be ready to assist it if overworked, or to take over its duties in the event of a sudden advance. The essential duty of the field ambulance is to evacuate the wounded. The medical and surgical equipment might well be reduced, but the number of light vehicles for transport of wounded could with advantage be increased. The field ambulance must remain the centre towards which all stretcher-bearers and light ambulance transport return. The surgeons after rapidly attending to the needs of the wounded must hurry them off to the rear by any means of transport which can be secured; the vehicles should, if possible, be sent off in groups or convoys. Dr. Follenfant considers the four-wheeled French ambulance wagon too heavy a vehicle for use in a field ambulance, as it cannot leave a metalled road. Cacolets are of little use, as the animals speedily get tired out; they could be more profitably employed in drawing light two-wheeled ambulance wagons or travois of the American pattern. C. E. P.

Preventive Vaccination against Bacillary Dysentery. By Dopter (*Annal. Past. Instit.*, September 27th, 1909).—Shiga, in 1898, found that subcutaneous injection of killed cultures of dysentery bacilli in man produced a local and general reaction which was too severe for general practice, but got more encouraging results by inoculating with a mixture of killed bacilli and specific immune serum. This latter method he employed from 1898 to 1900 in the prophylactic inoculation of 10,000 Japanese. The results showed no decrease in the incidence, but a very marked fall in the mortality. In 1905, Lüdke, experimenting with rabbits, proved that vaccination produced specific antibodies, agglutinins, and bactericidins.

Lately Dopter has set himself to answer the following questions as to the effects of vaccination with dysentery bacilli: (1) Is immunity produced? (2) How long does it last? (3) In how many days is it acquired? He uses adult mice and, to a less extent, white rats in his experiments, as these he found were less susceptible than other animals to the very severe local and general reaction which is the rule. He tried the effect of

different methods of vaccination, and his methods and the results he obtained may be summarised as follows :—

(1) *Vaccination by B. dysenteriæ alone.*—Vaccine prepared by killing the bacilli at 60° C. for one hour, and then drying in a vacuum. Twenty mice were inoculated subcutaneously with ·00001 gramme. Two died in four to five days. The remainder, fifteen days later, were inoculated with a lethal dose of a living culture (= $\frac{1}{80}$ agar tube, twenty-four hours' growth, normally killing in four days); 40 to 50 per cent. survived. The experiment was extended in several ways, and the result proved that: immunity was obtained in twelve days on the average and lasted from four to six weeks; before immunity was acquired (in twelve days) the animal was more susceptible to the action of the lethal dose, proving the existence of a "negative phase"; the local and general effects of the vaccination were severe.

(2) *Vaccination by the Products of Bacterial Autolysins.*—The toxins obtained by filtering broth cultures were used. The results were identical with those obtained by inoculating with the killed bacilli.

(3) *Vaccination by Antidysenteric Serum.*—A passive immunity is conferred. Immunity is conferred at once, but lasts only for ten days. This has been used with some success in man as a preventive. (Kruse, Rosculet, Michiel.)

(4) *Vaccination with Killed Cultures mixed with Serum.*—As noted above Shiga had previously tried this method on man, with not very encouraging results. However, a later experiment in 1900 was more successful when he successfully arrested an epidemic of dysentery in a village. The method employed was to give two doses of a mixture of vaccine and serum, the first dose consisting of equal proportions (quantity not stated) and the second dose in the proportion of eighty of culture to twenty of serum. There was slight reaction, and none of the inoculated contracted the disease with the exception of two who took ill on the day following the first dose.

Dopter's experiments on guinea pigs were done on the same lines :—

(*a*) Inoculation with one dose of serum-virus, prepared by mixing $\frac{1}{4}$ cc. serum with ·0005 gramme of dried bacilli (= 10 lethal doses) and tested with lethal doses of living cultures. Result—immunity established the day following inoculation but lasted only twenty days.

(*b*) Inoculated with two doses of serum-virus. First dose, = $\frac{1}{4}$ cc. serum + ·0001 gramme killed and dried bacilli; second dose given four to five days later = $\frac{1}{16}$ cc. serum + ·0001 killed and dried bacilli. Result same as (*a*).

Therefore vaccination with serum-virus confers rapid immunity but this lasts only twenty days; suppresses the negative phase and avoids accidents due to hypersensitiveness; still causes somewhat severe local and general reaction.

It is noted that the duration of the immunity conferred is inversely proportional to the amount of serum used; by increasing the serum the immunity may be made to disappear in fifteen days; serum appears to have a neutralising effect on the production of active immunity.

(5) *Vaccination by Sensitised Bacilli* (*cp.* Besredka, *Ann. Past. Inst.*, 1903).—Vaccine prepared in the following way: ·005 gramme of killed and dried Shiga's bacillus is emulsified in sterile normal salt and unheated strongly agglutinating antidysenteric serum is added up to 2 cc. Mix thoroughly and stand at room temperature for twelve hours when bacilli

sediment; decant off the clear serum and wash the bacilli twice in normal salt; then emulsify in 2 cc. normal salt. Mice inoculated with $\frac{2}{10}$ cc. (= ·00005 gramme sensitised bacilli = 10 times lethal dose) show no signs of illness, and when tested with lethal doses of living cultures show that: Immunity is acquired usually at the end of four days; no negative phase is produced; immunity lasts at least four and a half months (and probably more); no local or general reactions produced.

(6) *Vaccination by Digestive Tract.*—Guinea pigs of 20 grammes weight were fed on 5 milligrammes of killed and dried bacilli emulsified in 1 cc. milk for two to three days. Immunity was produced, but the following conditions had to be fulfilled:—

(*a*) Five milligrammes is the optimum dose and it must be repeated in two to three days, if the interval between the doses be prolonged for six, eight or ten days the animal sickens and immunity is not produced. If, however, the dose is lessened (*e.g.*, 2 milligrammes) the interval may be prolonged for eight to ten days and immunity obtained.

(*b*) Immunity is obtained only ten to twelve days after first ingestion, and does not last more than thirty days.

(*c*) A negative phase is produced during the first fifteen days.

This method is not applicable to man, as in comparison with the mouse, he would require 15 grammes of dried bacilli per day.

Practical Application.—The bacterial vaccine is impracticable, and the ingestion by mouth may be dismissed at once. The serum alone, or mixed with the vaccine (serum-virus), produces immediate immunity, and is therefore to be recommended in epidemics, but the immunity is short-lived—ten to twenty days. The serum-virus has the disadvantage of causing severe local and general reaction. The method of vaccination with sensitised bacilli promises best. J. C. K.

Correspondence.

AN ANCIENT USE FOR THE GENU-PECTORAL POSITION.

TO THE EDITOR OF THE "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS."

Sir,—The following extract from the writings of the illustrious Velpeau seems to me to contain amusement and instruction. It occurs in vol. iv. of the "Nouveaux Eléments de Médecine Opératoire," dated at Paris, 1839. The author is discussing the value of position for the reduction of strangulated hernia.

"Au lieu de placer le malade comme il a été dit plus haut, quelques chirurgiens, Winslow entre autres, avaient l'habitude dans le dernier siècle de le faire mettre à genoux, la tête basse appuyée sur les coudes, pendant qu'on pratiquait le taxis. Quelques âmes crédules ou bigotes étaient même parties de là pour engager les individus ainsi prosternés à faire de ferventes prières, prétendant que si dans cette posture leur hernie rentre c'est à l'intervention divine qu'il faut en rendre grâce."

This combination of methods seems to be now extinct. Have surgeons grown more jealous than of old?

Velpeau writes exhaustively on hernia, and his opinions are well worth reading. I am, &c.,

V. T. Carruthers,

Lieutenant, R.A.M.C.

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TREATMENT OF "TYPHOID CARRIERS."

BY MAJOR S. L. CUMMINS, CAPTAIN H. B. FAWCUS, AND CAPTAIN J. C. KENNEDY.

INTRODUCTION.

CONSEQUENT on the detection in Badajoz Barracks, Aldershot, in 1908, of a typhoid carrier who apparently caused a small outbreak of enteric fever in the East Kent Regiment and in a company of the Rifle Brigade, and on the arrival home from India of several typhoid carriers detected at the Naini Tal Depôt, the Army Medical Advisory Board deputed a Sub-Committee to investigate methods of treatment of the typhoid carriers.

After a careful examination of the dejecta of these cases, the Committee came to the conclusion that chronic carriers might be classified in the following groups:—

Group I.—Pure intestinal cases. Typhoid bacilli excreted only in the fæces.

Group II.—Urinary cases. Typhoid bacilli excreted only in the urine.

Group III.—Intestinal cases with symptoms of inflammation of the gall-bladder. Typhoid bacilli excreted in the fæces, but obviously having a focus in the gall-bladder.

Group IV. — Mixed intestinal and urinary cases. Typhoid bacilli excreted in both urine and fæces.

In the pure intestinal cases it was thought that it might be possible to disinfect the gastro-intestinal tract by the aid of lactic

acid bacilli. Two of the chronic carriers, Gunner C. and Private H., appeared to belong to Group I., and Captain Fawcus was asked to treat these cases with pure cultures of the Bulgarian bacillus.

In cases where the typhoid bacillus had invaded the urinary tract, and where there was an obvious implication of the gall-bladder, it appeared unlikely that administration of lactic acid would prove beneficial; accordingly Captain Kennedy was asked to treat the cases in Groups II., III., and IV. with gradually increasing doses of the anti-typhoid vaccine prepared at the Royal Army Medical College.

For purposes of treatment the carrier cases were admitted to the Queen Alexandra Military Hospital, London.

Under the lactic acid treatment Private H. ceased to excrete typhoid bacilli, but Gunner C. appeared to be little benefited. The general vaccine having proved ineffective on the remaining cases, Captain Kennedy prepared a special vaccine for each of these men, but the excretion of the bacilli was little affected by this line of treatment.

Owing to administrative difficulties the carriers cases were removed to the Royal Victoria Hospital, Netley, where Major Cummins assumed charge of the men and treated them, as well as the men already under his care, on the lines mentioned in his report. Unfortunately the results obtained were still negative, and the Advisory Board felt that it would be impossible to keep the carriers indefinitely in hospital, unless they elected to remain of their own free will. At the same time the Board realised that the "men" could not return to their regiments without seriously prejudicing the health of their comrades. Accordingly it was decided to invalid those men who had been under treatment in England for three months, unless they elected to remain in hospital in the hope of obtaining a permanent cure.

REPORT ON THE TREATMENT OF TWO CHRONIC TYPHOID "CARRIERS" BY MEANS OF LACTIC ACID BACILLI.

By Captain H. B. FAWCUS.
Royal Army Medical Corps.

In January, 1909, several chronic typhoid carriers, who had been invalided from India, were admitted to the Queen Alexandra Military Hospital for purposes of treatment. It fell to my lot to undertake the examination of the fæces and urine of these cases, and to carry out the treatment of certain of them by means of lactic acid bacilli.

It has been proved by Metchnikoff and Cohendy that when cultures of living lactic acid bacilli are administered by the mouth, a marked effect is produced on the flora of the intestine, the total numbers of the bacilli being greatly reduced, and certain species of micro-organisms being almost entirely wiped out. The lactic acid bacilli produce this effect by the conversion of sugar into lactic acid in the intestine, where it exercises a germicidal effect, more especially on the proteolytic and putrefactive bacteria. This can readily be recognised on examining the fæces of an individual who has been taking cultures of lactic acid bacilli for some time, and noting that all unpleasant smell and signs of putrefaction disappear as soon as the bacilli become established in the intestine. The reduction of putrefaction in the intestine is also shown by the marked decrease in the amount of organic sulphates present in the urine, and by the determination of these the action of the lactic acid bacilli can be estimated.

It was thought then that the lactic acid produced by these bacilli might in the case of a chronic carrier exercise a germicidal effect on the typhoid bacilli present in the intestine, or at least inhibit their production. This treatment could presumably only be of use in cases where the focus of infection was situated in the intestine itself. If the typhoid bacilli were being excreted from the gall-bladder, kidney, or urinary passages, it is inconceivable that the lactic acid could have any effect on their production. It is probable that the typhoid bacilli found in the fæces and urine of carriers are discharged from some necrotic patch or abscess cavity which may be situated in the liver, gall-bladder, intestine, kidney, or urinary passages, just as after an attack of typhoid fever an abscess may form on a bone, such as a rib or the tibia, and discharge large quantities of typhoid bacilli for considerable periods of time. Indeed, an explanation of the intermittency in the excretion of bacilli often noted may be looked for perhaps in the temporary closing of the opening of an abscess cavity into the intestine or urinary passage, and the opening of it again when the cavity is full.

Before commencing treatment the following experiments were carried out *in vitro*, with a view to determine what effect products secreted by the lactic acid bacilli have on typhoid bacilli :—

Experiment 1.—100 cc. of a diluted malt extract were inoculated with a growth of lactic acid bacilli and incubated at 37° C. After forty-eight hours there was good growth in the flask, and the con-

tents were filtered through a porcelain bougie. The filtrate was distributed into six test tubes, and four of these were inoculated, each with a different strain of *Bacillus typhosus*, the fifth tube was inoculated with *B. coli*, while the sixth was left uninoculated. The tubes were then incubated for six days at 37° C. with the following results:—

The reaction of the filtrate was + 10.

Tube		Inoculated with		Result
1	..	*B. typhosus*, McF.	..	Sterile.
2	..	" C.	..	Growth of *B. typhosus*.
3	..	" I.	..	Sterile.
4	..	" H.	..	Sterile.
5	..	*B. coli* (Escherich)	..	Growth of *B. coli*.
6	..	Uninoculated	..	Sterile.

Experiment 2.—100 cc. of a diluted malt extract was inoculated with a growth of lactic acid bacilli and incubated for six days at 37° C. The bacteria were filtered off as before with a porcelain bougie, and the filtrate was distributed in seven test-tubes. The reaction of the filtrate was less than + 20. Six of these tubes were each inoculated with a different strain of *B. typhosus*, and the seventh with *B. coli*, and the whole were incubated at 37° C. for six days with the following results:—

Tube		Inoculated with		Result
1	..	*B. typhosus*, McF.	..	Sterile.
2	..	" Aldershot	..	Sterile.
3	..	" L.	..	Sterile.
4	..	" C.	..	Sterile.
5	..	" H.	..	Sterile.
6	..	" I.	..	Sterile.
7	..	*B. coli* (Escherich)	..	Growth of *B. coli*.

These two experiments tend to show that lactic acid bacilli excrete some product which inhibits the growth of most strains of typhoid bacilli, but apparently has no such effect on *B. coli*, and this must be something other than lactic acid, as the amount of acid in the filtrate was in neither case sufficient to account for the results obtained. The one strain of *B. typhosus* which showed growth in the first experiment was that isolated from the fæces of Gunner C., one of the carriers, a fact which is interesting in the light of the subsequent result of his treatment.

The next two experiments were carried out to try and ascertain what amount of lactic acid was necessary to prevent the growth of *B. typhosus in vitro*.

Experiment 3.—To a series of nutrient broth tubes varying quantities of normal lactic acid were added. Each tube was then

inoculated with a loopful of a forty-eight hours' broth culture of the laboratory strain of *B. typhosus*, and incubated at 37° C. for forty-eight hours. Subcultures were then made from each tube and the contents titrated with decinormal alkali to determine accurately the acidity of each.

Tube	Amount of N. lactic acid added	Reaction on titration	Result
1	0·1 cc.	+ 30	Growth.
2	0·2 cc.	+ 40	Growth.
3	0·3 cc.	+ 54	Sterile.
4	0·4 cc.	+ 62	Sterile.
5	*Nil* (control)	+ 20	Growth.

Experiment 4.—Similar in detail to Experiment 3, but using three different strains of *B. typhosus*, and incubating the tubes for seven days.

Tube	Strain of bacillus	Reaction of broth	Result
1	*B. typhosus*, I.	+ 50	Growth.
2	,, ,,	+ 56	Sterile.
3	,, ,,	+ 60	Sterile.
4	,, H.	+ 52	Sterile.
5	,, ,,	+ 54	Sterile.
6	,, ,,	+ 60	Sterile.
7	,, C.	+ 50	Growth.
8	,, ,,	+ 64	Growth.
9	,, ,,	+ 70	Sterile.

These two experiments tend to show that the highest limit of acidity of a medium in which most typhoid bacilli can grow is one of about + 50, but that they can grow and flourish in a medium of any acidity lower than this. The high resistance of the strain C. and the comparative feebleness of the strain H. are again interesting in the light of the subsequent treatment of these cases. The next course was to choose suitable cases for treatment by means of lactic acid bacilli. Of the carriers at the Queen Alexandra Military Hospital three distinct types were found.

(1) Those who suffered periodically from gall-bladder symptoms and were intermittent in the excretion of typhoid bacilli in their fæces.

(2) Those who had no symptoms whatever and were regular in the excretion of the bacilli.

(3) Those who were excreting the bacilli in their urine only. Some of these were intermittent, others regular, in the excretion of the bacilli.

No case was found excreting the bacilli both in the urine and fæces. For treatment with lactic acid bacilli it was decided to choose only those cases which were of purely intestinal type; that

is, excreting the bacilli only in their fæces, and having no gall-bladder symptoms.

The two cases of this type chosen were Gunner C. and Private H.

Gunner C., Royal Artillery, aged 22. Service three years. Acquired enteric fever in Meerut in March 1908. He was sent to Naini Tal depôt on June 25th, and was found to be excreting typhoid bacilli in his fæces. He was invalided to Netley, and transferred to the Queen Alexandra Military Hospital on January 8th, 1909. On admission he was found to be excreting typhoid bacilli in large numbers.

Private H., Bedford Regiment, aged 22. Service three and a half years. Acquired enteric fever at Jhansi on May 15th, 1907. He was transferred to Kasauli Sanatorium on July 14th, 1907, and to Naini Tal depôt on April 10th, 1908. He was invalided to Netley on December 23rd, 1908, and transferred to the Queen Alexandra's Military Hospital on February 18th, 1909. On admission he was found to be excreting typhoid bacilli in moderate amount.

The fæces and urine of these cases were examined for typhoid bacilli, and estimations made of the actual numbers of typhoid and colon bacilli in the fæces, as a rule twice weekly while they remained in hospital. The following were the methods employed for the purpose.

Method of Examining Fæces and Urine for Typhoid Bacilli.—Samples of fæces and urine were obtained twice weekly, being taken from the morning evacuation of the days of examination. The samples were carefully collected and sent to the laboratory in sterile, large-mouthed glass bottles. The fæces having been thoroughly mixed with a glass rod, about 0·5 gramme was well rubbed up in 20 cc. of sterile water in a large test-tube, which was allowed to stand for two or three hours. At the end of that time quantities varying from one loopful to 0·5 cc. were taken from the surface of the liquid without disturbing the sediment, and spread on large plates of brilliant green bile salt lactose agar.[1] After being thoroughly dried the plates were incubated at 37° C. for 48 hours. At the end of that time typhoid colonies could easily be distinguished and the bacilli, if present in the fæces, were readily recovered. Typical colonies were fished and proved culturally and by their reaction to a typhoid serum.

In the case of the urine, quantities up to 1 cc. were spread on

[1] Journal of the Royal Army Medical Corps, February, 1909.

plates of the same medium, and quantities from 1 to 10 cc. added to MacConkey's bile salt glucose peptone in case there happened to be less than one bacillus per cc. of the urine.

Method of Estimating the Numbers of B. coli *and* B. typhosus *in the Fæces.*—After thoroughly mixing the sample of fæces, 0·1 gramme was accurately weighed in a small porcelain dish; 10 cc. of sterile water were gradually added, and the fæces thoroughly rubbed up in it until a fine homogeneous emulsion was obtained. This made a dilution of 1 in 100; 1 cc. of this was then placed in a stoppered glass cylinder, and made up to 50 cc. with sterile water, making a dilution of 1 in 5,000. This was well shaken to ensure separation of the bacilli, and successive dilutions in tenths were made from this, using 1 cc. of each dilution and adding it to 9 cc. of sterile water to make the next. After being well mixed, 0·5 cc. of each of the dilutions was spread on the surface of a plate of bile salt neutral red lactose agar. The plates were then placed in the incubator with the lids off until the surface of the medium was quite dry, when the lids were replaced and the plates turned upside down. In this way, on some of the plates, isolated colonies were obtained, and could be counted after twenty-four hours in the incubator. For the purposes of the count all red opaque colonies were considered to be *B. coli*, as no object was to be gained by differentiating them further. The neutral red bile salt lactose medium gives excellent differentiation of the colonies and of the non-lactose fermenting colonies; after a little practice it became easy to pick out those of *B. typhosus* with tolerable certainty. Any doubtful, and several typical, colonies on each occasion were tested with a typhoid serum and by subculture in the various sugars. The only organism which caused much confusion on the plates was *B. fæcalis alcaligenes*. The average count of at least two plates was taken in each case to obtain the number of bacilli per gramme of the fæces. Of course complete accuracy was not possible, and these estimations can only be taken as a rough guide to the actual numbers. In the process no notice was taken of the varying consistency of the fæces, which would, of course, have a great effect on the total number of bacilli per gramme present. It would doubtless have been more accurate to take the whole of the fæces passed in the day, and take the bacilli present in the portion examined as a fraction of the total number of bacilli passed per diem, but the difficulty of obtaining and manipulating the whole bulk of the fæces was almost insurmountable. It was also found that when the administration of lactic acid bacilli had been in force

for some time the consistency of the fæces varied extraordinarily little from day to day.

Preparation of the Cultures and Method of Administration of Lactic Acid Bacilli.—Several of the many commercial preparations of lactic acid bacilli now on the market were examined with a view to obtain a suitable strain of the bacillus for making the cultures. Most of these were found to be grossly contaminated with other organisms and quite useless. In two preparations the lactic acid bacillus was found to be present in pure culture—Lactobacilline powder, prepared by La Société de Ferment, Paris, under the supervision of Professor Metchnikoff, and "Lactigan," a fluid preparation made by Oppenheimer, Son and Co., London. Bulgarian bacilli, isolated from these two preparations in pure culture, were used throughout the treatment.

The bacillus corresponded in its morphology and cultural reactions to the Bulgarian bacillus or bacillus of Massol described by Cohendy,[2] and has the following characteristics :—

Morphology.—It is a long, thick rod resembling the anthrax bacillus, but varying from 2 to 20 μ in length. It is non-motile and has never been observed to form spores. On a solid medium the bacilli tend to grow in long chains, forming very characteristic colonies. These colonies do not become visible for forty-eight hours, and at that age appear to the naked eye as tiny flakes of snow on the surface of the medium with very irregular edges. Under the low power of the microscope they are seen to consist of wavy bundles of bacilli winding about in all directions and sending out off-shoots from the edges, giving the colony a "Medusa-head" appearance. This appearance is shown in the accompanying photograph.

The bacillus stains well with the ordinary dyes, and is Gram positive when alive. The dead bacilli in a culture fail to retain the stain by Gram's method. It is a facultative anaerobe.

Growth and Cultural Reactions.—The bacillus will not grow at all in ordinary laboratory media free from sugar of some kind, which is essential to its growth. On all media made from milk or whey it grows luxuriously, forming much acid. Its optimum temperature of growth is 37° to 40° C. It ferments all sugars, but more especially lactose, maltose, and glucose, and produces from them lactic acid, but never forms gas in any medium. Milk is turned strongly acid and firmly clotted. Cultures in milk left in the

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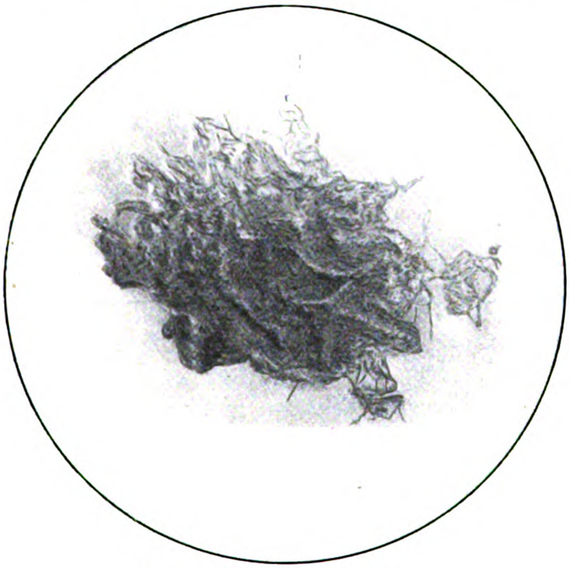
[2] "Comptes-rendus de la Société de Biologie," 1906 (I.).

incubator do not remain alive longer than four or five days when kept at room temperature; after twenty-four hours in the incubator they will, however, keep alive for about a fortnight. The best media in which to grow cultures of the bacillus are sterile milk, Cohendy's sugar-whey medium, or diluted malt extract. Cohendy's[3] whey medium is made thus: Boil some milk gently for five minutes, add then to the boiling milk 1·5 cc. of HCl per litre, when the casein becomes completely coagulated. Some minutes later separate with a strainer the casein from the whey. Neutralise the latter and add 300 cc. of water, 3 grammes of gelatine, and 15 grammes of cane



Colony of Bulgarian Bacillus.

sugar for one litre of the whey. Place in the autoclave at 115° C. for twenty minutes and filter, 1·5 per cent. of Witte's peptone may be added if required. It can be made into a solid medium by adding 1·7 per cent of agar.

The extract of malt medium is equally good, and is much more easily made and more convenient to work with. It is made by diluting 25 cc. of extract of malt to one litre. Place in steamer for twenty minutes and allow to stand in a cool place for twenty-four hours; decant off the clear liquid and sterilise on three successive days. To make a solid medium add 20 grammes of agar to the litre.

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[3] *Comptes-rendus*, 1906 (I.).

For ingestion by patients the cultures can be grown in sterile milk or in the diluted malt extract. For the treatment of the carrier cases the latter was chosen as being easier to sterilise, more constant in composition, and leaving less residue in the intestine.

The Bulgarian bacillus was kept alive and vigorous by daily subculture in litmus milk tubes. For the daily dose a flask of the malt was inoculated with several loopfuls of a forty-eight hours' litmus milk culture, and incubated for forty-eight hours. At the end of that time the malt showed a thick growth of the bacillus and was ready for consumption. The culture had a pleasant acid taste. Each dose was followed by a teaspoonful of pure malt extract. No other treatment was given, and both men were on a full diet the whole time. The bacillus was quite innocuous and caused no symptoms at any time.

TABLE I.—RESULTS OF QUALITATIVE EXAMINATION OF THE FÆCES AND URINE FOR B. TYPHOSUS.

Dates of Examination.

Name		January			February						March							
		13th	20th	27th	3rd	11th	15th	19th	23rd	26th	2nd	5th	9th	12th	16th	19th	23rd	26th	30th
C.	Fæces	+	+	+	+	+	+	+	+	+	+	+ *	+	+	+	+	+	+	...
	Urine	–	–	–	–	–	–	–	–	–	–		–	–	–	–	–	–	...
H.	Fæces	...	...	...	...	...	...	...	...	+	+	+ *	+	+	+	+	+	–	+
	Urine	...	...	...	...	...	...	...	...	–	–		–	–	–	–	–	–	–

Name		April									May							
		2nd	6th	9th	13th	16th	20th	23rd	27th	30th	4th	7th	11th	14th	18th	21st	25th	28th
C.	Fæces	...	+	...	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	Urine	...	–	...	–	–	–	–	–	–	–	–	–	–	–	–	–	–
H.	Fæces	+	+	...	+	+	+	+	+	–	–	–	–	–	–	–	–	–
	Urine	–	–	...	–	–	–	–	–	–	–	–	–	–	–	–	–	§

Name		June									July					
		1st	4th	8th	11th	16th	18th	22nd	25th	29th	2nd	6th	13th	15th	20th	23rd
C.	Fæces	...	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	Urine	...	–	–	–	–	–	–	–	–	–	–	–	–	–	–
H.	Fæces	...	–	–	–	–	–	–	–	...	–	–	–	–	–	–
	Urine	...	–	–	–	–	–	–	–	–	–	–	–	–	–	–

+ = *B. typhosus* found.
– = *B. typhosus* not found.
... = Not examined.
* = Treatment commenced.
§ = Treatment stopped.

Method of Isolating the Bulgarian Bacillus from the Fæces.—In order to prove that the bacilli had become established in the intestine, the fæces were examined for their presence twice weekly throughout the course of the treatment. The method employed was as follows:—

Tubes of lactic acid milk were prepared as recommended by Cohendy (*loc. cit.*) by adding 3·5 grammes of lactic acid to a litre of litmus milk. This formed a semi-solid red mass which was then placed in test tubes and sterilised in the usual way. A tube of this acid milk was inoculated with a portion of the fæces to be examined. After five to ten days at 37° C. loopfuls of it were placed on the solid malt medium already described. The acid milk inhibits the growth of almost all other bacteria, and allows the growth of the lactic acid bacillus. After incubating the plates for forty-eight hours the typical colonies of the bacillus can easily be recognised. Sometimes the bacillus could be isolated by direct plating of the fæces on the malt medium, but it was more certain to use preliminary incubation in lactic acid milk.

Details of Course and Results of Treatment.—Gunner C.: The results of the qualitative examination of the fæces and urine of this case are shown in Table I. It will be seen that both before and after treatment he continued to excrete the typhoid bacillus regularly without one single intermission.

In Chart 1 will be seen the results of the enumeration of the typhoid and colon bacilli in the fæces. Before treatment was commenced three estimations were made, the numbers of *B. coli* varying from 207,000,000 to 4,000,000 per gramme of the fæces, and of *B. typhosus* from 190,000,000 to 14,000,000 per gramme. This enormous variation was probably due to the fact that the varying consistency of the fæces was ignored. It was evident, therefore, that no alteration in the number of the bacilli between these amounts could be taken as being due to the treatment.

On March 8th treatment was commenced with a dose of 25 cc., and four days later this was increased to 50 cc. At the next estimation the number of typhoid bacilli had decreased considerably, while a corresponding rise had taken place in the numbers of *B. coli*. On the 17th the amount of culture given was increased to 100 cc. daily, taken in two doses. Following on this there was an enormous drop in the coli count, without much alteration in the numbers of typhoid bacilli. On March 26th there was a sharp temporary rise in the numbers of *B. typhosus*, but at the next estimation they had fallen to the lowest level yet attained. This was, however, soon followed by another sharp rise in the typhoid count, but the coli count still remained at a low level. On April 13th the Bulgarian bacillus was first isolated from the fæces, and subsequent examination showed that the bacilli were well established. An increase of dose to 250 cc. was followed

again by a large decrease in the numbers of both typhoid and colon bacilli, this, however, was only temporary as regards the typhoid bacilli, which rose again shortly afterwards. On June 2nd the dose was increased to 300 cc., which was followed by the usual drop in the numbers of bacilli, but this had no lasting effect, and from this time the counts of the bacilli pursued an irregular course. At the end of July the man was transferred to Netley, having apparently derived no benefit from his treatment. It will be noted that from June 16th to the 25th the Bulgarian bacillus could not be found in the excreta. On inquiry into the reason for this it was found that several times during the month of June the man had not taken the prescribed dose of lactic acid bacilli. To this may have been due the subsequent rise in the numbers of typhoid bacilli. It cannot be said that the treatment had no effect whatever on the excretion of *B. typhosus*, as each increase of dose was followed by a fall in numbers, and it must be borne in mind that the strain of bacillus of this case was found *in vitro* to be particularly resistant to the products of the lactic acid bacilli.

Private H.: The results of the qualitative examinations of the fæces and urine of this case for typhoid bacilli are also shown in Table I. It will be seen that before treatment he was excreting the bacillus regularly in his fæces.

Chart 2 gives the results of the enumeration of typhoid and colon bacilli.

Before treatment commenced three estimations gave numbers varying from 7,500,000 to 2,500,000 of *B. coli*, and from 4,500,000 to 3,000,000 of *B. typhosus* per gramme of the fæces.

Treatment was commenced on March 8th, with 25 cc. of the culture. There followed immediately a drop in the numbers of bacilli, but they rose again soon afterwards. The dose was increased to 50 cc. on March 12th, and to 100 cc. on March 17th. This increase was again followed by a decrease in the numbers of both bacilli, and on March 26th the fæces were found to be free from typhoid bacilli. This coincided with the first appearance of the lactic-acid bacilli in the fæces. However, the typhoid bacilli appeared again on the next examination, and increased largely in numbers during the next week. On April 3rd the dose was increased to 200 cc., which again brought down the numbers of typhoid bacilli, to be again followed by a subsequent rise. On April 29th the dose was increased to 250 cc. daily, and on the next examination no typhoid bacilli were found in the fæces. From that date they have not again been recovered on any occasion.

Treatment was continued until May 28th, when it was stopped, and no further doses of lactic acid bacilli were given. On June 11th there was a considerable rise in the numbers of *B. coli,* showing that the effect of the lactic acid bacilli was wearing off, but it was accompanied by no sign of typhoid bacilli. The Bulgarian bacillus finally disappeared from the fæces on June 13th, nineteen days after the last dose was given. On July 23rd the man was discharged to duty apparently cured, having been free from typhoid bacilli for three months. Thus in this case treatment by lactic acid bacilli was completely successful. From this it may be assumed that lactic acid bacilli may be of use in the treatment of a certain type of "carrier." It was shown in the experiments carried out *in vitro* that the strains of bacilli excreted by these men differed considerably in their resistance to the toxins of the lactic acid bacilli, and to this we may look for an explanation of the different results. Again, it may be that the focus of infection was in each case in a different situation, the one easily accessible to the lactic acid bacilli, the other out of their reach. The true explanation is impossible to find at present, and the most that can be said, as a result of these experiments, is that some cases of chronic typhoid "carriers" may be relieved of their distressing disability by means of this treatment, and for that reason it is worth a further trial.

TREATMENT OF TYPHOID CARRIERS BY ANTI-TYPHOID VACCINE.

By Captain J. C. KENNEDY.
Royal Army Medical Corps.

Preliminary Observations.—It was desired to obtain some idea of the immune substances present in the blood of each of the seven cases, and estimations were therefore made of the agglutinins and of the opsonins.

Agglutinins.—The following were the reactions obtained with a virulent laboratory strain of *Bacillus typhosus* :—

Private S.: Incomplete in a dilution of 1—160.
Lance-Serjeant I.: Complete in a dilution of 1—100, not in 1—120.
Private L.: Complete in a dilution of 1—80.
Bombardier S.: Incomplete in a dilution of 1—80.
Private O'N.: Complete in a dilution of 1—40.
Gunner C.: Incomplete in a dilution of 1—20.
Private H.: Incomplete in a dilution of 1—20.

A further series of observations was then made to see whether the sera of these men behaved differently when tested with their individual strains of *B. typhosus*; at the same time they were tested against a non-virulent laboratory strain. The results are tabulated below:—

	B. typhosus. Non-virulent					*B. typhosus* Virulent					*B. typhosus* Specific strain				
Serum dilutions	10	20	40	80	160	10	20	40	80	160	10	20	40	80	160
Gunner C. ..	±	+	±	–	–	+	±	±	–	–	±	–	–	–	–
Private L. ..	..	+	+	±	–	+	+	+	+	–	+	+	+	±	–
Bombardier S...	+	+	+	±	..	+	+	+	±	..	+	+	+	±	..

+ Signifies complete agglutination. ± Signifies incomplete agglutination.
— Signifies no agglutination.

The serum of Lance-Serjeant I. was tested against the virulent laboratory strain and his own specific strain, with the following result:—

Dilution	Virulent	Specific
10	+	Not tested
20	+	,,
40	+	,,
80	+	,,
100	+	±
200	–	–

The serum of Private H. tested against the two laboratory strains gave a complete reaction in 1—40 and incomplete in 1—80 with the non-virulent laboratory strain; with the virulent the reaction was incomplete in the 1—20 dilution.

Opsonins.—The first observations were made with the sera of Private L. and Gunner C. Two methods were employed:—

(i.) Klien's method, in which the dilution of serum which will give a phagocytosis per cell of 0·5 is estimated.

(ii.) The heated serum of the patient was diluted to 1—4 and added to equal volumes of washed cells and bacterial emulsion. The phagocytic index of the immune sera was then obtained by dividing the average phagocytosis per cell obtained with the patient's serum by that obtained with the normal serum.

Each serum was tested with the above-mentioned virulent strain and the non-virulent laboratory strain, and also with the specific strain derived from the patient himself.

The control normal serum in each experiment was tested with the two laboratory strains only.

The following tables give the results :—

(1) *Klien's Method.*—The numbers indicate the dilution of serum which was necessary to give a phagocytosis of 0·5 bacterium per cell.

Serum	*B. typhosus* Non-virulent	*B. typhosus* Virulent	*B. typhosus* Specific
Normal	About 28	6	—
Gunner C.	„ 96	20	9
Private L.	96	96	70

(2) *Diluted Heated Serum.*—The numbers indicate the average number of bacilli phagocyted by each cell.

Serum	*B. typhosus* Non-virulent	*B. typhosus* Virulent	*B. typhosus* Specific
Normal	0·3	0·2	—
Gunner C.	0·6*	0·5	0·45
Private L.	0·7*	2·0	1·25

* These slides were very difficult to count, there being many "ghost forms" and evidence of lysis.

An examination of these tables will show that they agree in the main, with the exception of the figures marked*.

The following points were deduced from these experiments :—

(1) That the virulent strain of *B. typhosus* would be more reliable for future work than the non-virulent strain, which was too easily phagocyted and bacteriolysed.

(2) That the specific strains were less easily phagocyted than the laboratory strains. This corresponds with the observations on the agglutinins, especially with regard to Gunner C.

(3) That the ratio of the phagocytic power of the three sera, when tested against the virulent laboratory strain, was very similar with both methods. Klien : Normal, Gunner C., Private L., 1, 3, 16. Heated serum: Normal, Gunner C., Private L., 1, 2·5, 10. Compare this with the agglutination reaction, Gunner C. = 1—20; Private L. = 1—80.

On account of the labour involved in Klien's method, all the subsequent opsonic observations were made with the heated diluted serum and, where possible, a control observation was made by Klien's method with one of the sera (L.'s), the strain used being the virulent laboratory one.

The sera of Lance-Serjeant I. and Bombardier S. were also tested

for opsonins against the laboratory strain, and gave indices of 13 and 2·25 respectively, compared with Private L. and Gunner C., 10 and 2·5 respectively.

Treatment by Vaccine.—The vaccine used was the prophylactic vaccine prepared at the Royal Army Medical College from the strain mentioned above as non-virulent. It was administered in doses rising to 1,000 million, at intervals of a week to ten days, until the middle of April. At this time as the cases did not show any sign of improvement it was considered advisable, in view of the indication afforded by agglutination and opsonic experiments, to substitute a vaccine prepared from the carrier's own strain of *B. typhosus*. Vaccines were accordingly prepared from the strains of Private L., Lance-Serjeant I. and Bombardier S., and administered during the months of May and June.

The particulars of the cases are as follows (*vide* Charts) :—

Private L., Vaccine (prophylactic)—

Administered	10th February ..	20 million ..	Local reaction.
,,	8th March ..	500 ,, ..	,, ,, and malaise.
,,	16th[1] ,, ..	1,000 ,, ..	Slight local reaction and malaise.
,,	24th ,, ..	1,000 ,,	
,,	31st ,, ..	1,000 ,,	
,,	9th April ..	1,000 ,,	
,,	19th ,, ..	1,000 ,,	

Vaccine (specific)—

Administered	10th May ..	250 million ..	No reaction.
,,	12th ,, ..	500 ,, ..	Severe local reaction.
,,	20th ,, ..	250 ,,	
,,	26th ,, ..	500 ,, ..	Very slight reaction.

On May 31st he contracted diphtheria and was transferred to the Metropolitan Asylums Board Hospital.

Observations on the agglutinins and opsonins were made from February 10th to May 5th. No observations could be made after the administration of the specific vaccine on account of his removal.

Chart 7 indicates the opsonic curve and shows that the agglutination remained stationary.

The double observation of the opsonic content serves as a control, but unfortunately the control shows a marked discrepancy on April 15th.

The excretion of germs in the stools showed an intermission dating from April 16th for a period of several weeks.

Bombardier S.: Vaccine (prophylactic)—

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[1] Region of gall-bladder.

Administered	8th March	.. 400	million	..	Local reaction.
,,	24th ,,	.. 1,000	,,	..	Very slight reaction.
,,	30th ,,	.. 1,000	,,	..	,, ,,
,,	9th April	.. 1,000	,,		
,,	19th ,,	.. 1,000	,,		

Vaccine (specific)—

Administered	10th May	.. 250	million	..	No reaction.
,,	12th ,,	.. 500	,,	..	Severe local reaction two days.
,,	20th ,,	.. 500	,,	..	Slight reaction.
,,	27th ,,	.. 500	,,	..	,, ,,
,,	3rd June	.. 750	,,	..	,, ,,
,,	11th ,,	.. 1,000	,,	..	,, ,,
,,	17th ,,	.. 1,000	,,	..	,, ,,

Effect on immune substances. (*See* Chart 6.)

Agglutinins rose from 1—80 to 1—160, and then remained stationary during administration of the prophylactic vaccine, but after the use of the specific vaccine they rose to 1—300, when tested against the virulent laboratory strain.

Opsonins showed a steady rise all through, as tested against the virulent laboratory strain. There was also a marked increase latterly when tested against his own strain of *B. typhosus*.

The chart also gives the acidity of the urine and the number of typhoid bacilli excreted in each cc. of urine.

Lance-Serjeant I.: Vaccine (prophylactic)—

Administered	16th March	.. 500	million	..	Very slight reaction.
,,	24th ,,	.. 1,000	,,	..	,, ,,
,,	30th ,,	.. 1,000	,,	..	,, ,,
,,	9th April	.. 1,000	,,	..	,, ,,
,,	19th ,,	.. 1,000	,,	..	,, ,,

Vaccine (specific)—

Administered	20th May	.. 250	million	..	Moderate reaction.
,,	26th ,,	.. 500	,,	..	,, ,,
,,	3rd June	.. 700	,,	..	,, ,,
,,	11th ,,	.. 1,000	,,	..	,, ,,
,,	17th ,,	.. 1,200	,,	..	,, ,,

For observations on agglutinins and opsonins, *see* Chart 5.

The *agglutinins* remained stationary all through the period of administration of the prophylactic vaccine (viz., 1—100), but after the specific vaccine was given they rose to 1—160, when tested against the virulent laboratory strain.

The *opsonins* show a steady rise until the observation of May 5th, on which date the phagocytic ratio was only 55 as compared with 134 on April 15th.

The curve at the foot of the chart is interesting, and shows the acidity of the urine as per cent. of lactic acid. The black line

marked NaH_2PO_4 represents the time during which acid sodium phosphate was given, and the increase in the acidity is well marked.

There was, however, no cessation of excretion of bacilli in the urine. On April 30th and May 4th the acidity rose to the normal, and on these days the urine was free from bacilli; it was also quite clear. At all other times the urine was cloudy.

With the reappearance of the bacilli on May 11th the acidity fell to its former level and the urine became cloudy.

It will be remarked that the phagocytic ratios obtained in all these experiments are unusually high. This is to be explained by the fact that the serum was diluted four times, and consequently the phagocytosis by the normal serum was so slight at times as to be almost not significant. The other alternative (conditions favouring phagocytosis with the normal serum) meant that the immune sera produced such an enormous phagocytosis as to render an accurate count a practical impossibility. The normal serum used was obtained from the same individual throughout.

REPORT ON THE TREATMENT OF TYPHOID CARRIER CASES IN THE ROYAL VICTORIA HOSPITAL, NETLEY.

By Major S. L. CUMMINS.
Royal Army Medical Corps.

The "typhoid carriers" under my care during the year 1909, in the Royal Victoria Hospital, Netley, are shown in Table A, with tabulated particulars explaining their cases.

It will be noticed that, of the men sent home from India as "typhoid carriers," three arrived at Netley free from typhoid bacilli; or at least so far free that no bacilli could be isolated from the excreta.

Two "carriers" were admitted from stations other than India. Of these, Serjeant I. had been discovered by Major Cochrane, R.A.M.C., when investigating an outbreak of enteric fever at Aldershot in 1908; the other, Corporal P., R.A.M.C., was found to be a carrier during the examination in the spring of 1908 of all men employed in the cooking section, Royal Army Medical Corps. Both these men had suffered from enteric fever a long time before their detection as carriers (from 1900 and 1904 respectively), and presumably had been passing bacilli at intervals since.

I only succeeded in isolating typhoid bacilli from Corporal P. on one occasion; and he was finally discharged to duty, with the reservation that he should no longer serve in the cooking section, and be subject to periodical examination of the fæces.

In investigating these cases, the main object was to search for some form of treatment suitable for cutting short the excretion of germs. It must be admitted that no definite success has yet been attained in this direction, but various lines of treatment have been tried, and the ground, to some extent, has been cleared for further work.

TREATMENT.

FÆCAL CARRIERS.—The following lines of treatment were tried: Lactic acid bacilli; antiseptics; and X-ray therapy. For tabulated results, *vide* Table B and Charts 1, 3, 4, 8, 9 and 10.

Lactic Acid Bacilli.—A strain of the Bulgarian bacillus, isolated by Captain Fawcus, was used as follows:—

Flasks containing 300 cc. of sterile milk were inoculated from a twenty-four hours culture of the bacillus in litmus milk, incubated for twenty hours at 37° C., and the resulting "junket" with plenty of sugar was given to the men twice daily. A very plentiful growth of lactic acid bacilli was obtained in these flasks, and that the bacilli were early "established in the intestine" was shown by recovering them from the fæces by means of acid-whey and subsequent plating on malt agar. The men did not object in the least to the "junket," and seemed in no way inconvenienced by taking it. The results were, however, disappointing, as no appreciable difference in the excretion of typhoid bacilli followed the extended trial of the treatment.

Antiseptics.—In the case of Bombardier S., a modified "empty-bowel" treatment, combined with the exhibition of urotropin, was tried. On August 3rd, 1909, the patient was transferred to a separate ward, and put on a diet consisting of four pints of milk and two eggs daily. It was hoped that the comparatively small residue from this diet would enable the antiseptic to act in fair concentration in the duodenum, as it was recognised that an ordinary diet must greatly dilute any antiseptic given with it. The bowel was "prepared" beforehand by a dose of calomel over night and ½ ounce of castor oil next morning. After the first day, two teaspoonfuls of castor oil were taken each morning. Twelve grains of urotropin were given three times a day for the first three days, then four times a day, and finally five times in the day.

At the end of a week, the patient had lost considerably in weight, and objected to continuing the treatment, so he was put back on ordinary diet.

The bacterial "count" rapidly and steadily fell during the week of treatment. It was 470,000,000 per gram before the treatment commenced, and the counts for the remainder of the week were 70,000,000, 62,000,000, and finally 2,000,000 only. Two days after return to ordinary diet, the count again rose to 212,000,000, showing that the antiseptic had only killed a large proportion of the bacilli in the intestinal contents, but had not touched the real source of supply.

Jey's intestinal palatinoids of cyllin were then tried, with ordinary diet, in the cases of Bombardier S. and Corporal P. In Bombardier S.'s case the "count" was not appreciably affected by them, so they were stopped; and Corporal P. was only given them after the single occasion on which typhoid bacilli were found in his fæces. He remained free from bacilli during the remainder of his time at Netley, but I do not see any reason to attribute this result to the cyllin, as he was never a severe case, and the drug failed to modify the numbers excreted by Bombardier S. to any very marked extent.

Medical Izal Oil.—Noticing a paper by Dr. A. Knyvett Gordon in the *Practitioner* of August, 1908, in which medical izal oil was strongly recommended for the treatment of enteric fever, I obtained some of the oil, and tried it in the cases of Gunner C. and Bombardier S. It is to be regretted that this line of treatment had not a fair chance of exhibiting its merits, as, very shortly after it had been started, it was decided to give the "carriers" the option of being "invalided" or remaining under treatment; and both these men elected to leave the Service. So far as could be judged from the short trial given, medical izal oil would seem to have an effect on the number of typhoid bacilli excreted; but the "count" tended to rise again on its being discontinued, as will be seen on consulting the chart of Bombardier S.

As recommended by Dr. Knyvett Gordon, the oil was given as an emulsion in mucilage of tragacanth, in the proportion of three minims of oil to each ounce of the emulsion. Two ounces of this was given four times a day, followed by a drink of water. The men strongly objected to it, and discontinued it at once on being allowed to choose "invaliding" instead of treatment. Dr. Gordon gave, as a routine, a similar dose every two hours during the day, and every four hours at night; and found that patients soon learnt to tolerate it well.

Possibly it may cause less nausea to a fever patient on low diet than to a healthy man on ordinary food; but my "carriers" objected to it even more strongly at the end than at the beginning, and were with great difficulty persuaded to take it.

X-ray Treatment.—The following experiment was carried out to ascertain whether exposure to X-rays would inhibit growth of typhoid bacteria *in vitro*.

An emulsion of a twenty-four hours growth on agar was counted by plating after dilution. A portion of it was then transferred to a sheep's bladder, which had been sterilised by boiling. The bladder was "exposed" for ten minutes, at 6 inches from a Crook's tube of a 11-inch spark gap. The contents were then withdrawn, diluted, and plated.

The counts showed 220 million bacilli per cc. in the original emulsion and 140 million per cc. in the X-ray emulsion; a difference which, though large, might perhaps be explained by faulty technique, or by adhesion of bacilli to the walls of the "bladder."

It seems possible, however, that apart from any bacterio-inhibitory action, the X-rays might bring about an increased phagocytosis in the walls, for instance, of an inflamed gall-bladder, and it was decided to try it in the case of Private L., who presented symptoms of slight cholecystitis.

Private L.'s fæces were found to contain typhoid bacilli in fair numbers on July 29th. On August 6th, X-ray treatment was commenced, the patient being "exposed" for three minutes to a 3-ampère current in a tube with a 6½-inch spark-gap; the area of the gall-bladder was exposed, the surrounding skin being protected by lead plates. This was repeated three times a week up to ten exposures; it was discontinued on August 30th.

While this treatment was continued, and for three weeks afterwards, the patient's stools were searched in vain for typhoid bacilli. These reappeared in small numbers on September 20th and 23rd; again disappearing from that date until October 4th, when they were again found in fair numbers. They were constantly present until October 21st, inclusive. X-rays were recommenced on October 20th. Though still present the day after the first exposure, none were found on October 25th or 28th, four colonies only were seen on two "Drigalski" plates on November 1st, and none on November 5th, 9th and 12th. The patient left hospital on November 16th, X-ray treatment being stopped on November 15th.

A stool sent to me by the patient on December 6th was free of typhoid bacilli.

When examining the records of this case, it should be noted that, while under observation in London, the patient had been for six weeks free from typhoid bacilli. He is an intermittent "carrier," and it is impossible to say that any particular period of

freedom from germs has been brought about by treatment. It must be confessed, however, that the coincidence of dates is very curious, if the "intermissions" noted at Netley are quite unconnected with the X-ray treatment.

This treatment was further tried in the case of Gunner S., who had on one occasion complained of pain over the gall-bladder. It appeared less logical in his case, as there was no reason to suspect cholecystitis, except the solitary day of pain first mentioned. The patient received ten exposures similar to those used in the case of Private L. During all the period of treatment, the patient continued to pass typhoid bacilli in large numbers, but still the chart shows a distinct depression between September 27th and October 18th, the time during which the exposure lasted.

An attempt was also made to try the effect of X-rays on a urinary case. Lance-Serjeant I., who was constant in excreting large numbers of bacilli, was selected for this experiment. He received in all eighteen exposures, nine over each kidney. In his chart, too, a very decided depression appears between September 27th and October 26th, followed by a dramatic "leap" after cessation of the treatment. The "leap," however, was not entirely due to an increase in number of bacilli, but co-existed with the discovery that the patient's urine contained traces of agglutinins for typhoid bacilli, and that thorough agitation in a sterile flask greatly increased the number of colonies on a plate. It is certain that the total number of bacilli passed by Lance-Serjeant I. is underestimated throughout his chart, owing to the late discovery that these agglutinins existed; but the same under-estimation was in existence both before and during the treatment by X-rays, so these two periods can be compared without fallacy.

Urinary Carriers.—*Vide* Charts 3 and 4.

Lance-Serjeant I. and Bombardier S. were treated with sodium benzoate and acid phosphate of soda, in the hope of thus raising the acidity of their urine, and bringing about a condition unfavourable to the growth of typhoid bacilli. The reaction of the urine was recorded daily throughout the experiment. It is sufficient to say that it was found impossible to raise the acidity permanently above the normal by even large doses of these drugs, and that no definite diminution in the excretion of bacilli resulted from the treatment.

I have already spoken of the use of X-rays in the case of Lance-Serjeant I., so need not mention this further.

A promising line of treatment suggested itself shortly before the

patients left hospital. It appeared that urotropin, which had previously been tried without success in these two cases, might act better if combined with a powerful diuretic, as the latter would tend to eliminate the drug while still in fairly high concentration, and by flushing out the kidneys bring about a more thorough "contact" between the antiseptic and the deposits of typhoid bacilli.

In the case of Bombardier S., the treatment was started on October 25th. The urine was found free from bacilli when next counted on October 28th. On November 1st a "record" count was made for this case, which is largely explained by the discovery, already mentioned, that thorough agitation of the urine before plating, increases the "count" by breaking up agglutinated "clumps" of bacteria. It should also be noted that the patient returned on that morning from an absence of two days "on pass," during which the medicine had not been taken.

Counts made on November 6th, 9th, 12th and 14th were all decidedly low. In the case of Lance-Serjeant I., the treatment brought about a marked change in the urine itself. This had always contained a very considerable amount of pus, being thickly turbid when passed, and depositing an inch or more of purulent mucus on standing in a urine glass.

When treated with "sanmetto" and urotropin, the deposit became almost nil, and this was coincident with a remarkable fall in the bacterial content of the urine. I may say that this fall was even more marked than would appear on the chart, as the urine was latterly thoroughly "shaken" before plating, while this was not done previous to the end of October. The diminution in the excretion of bacilli was not maintained, however, after cessation of treatment, as a sample sent me by Serjeant I., who had taken no medicine since November 23rd, was found crowded with bacilli on December 6th.

I believe that much might be accomplished in urinary cases by combining sanmetto and urotropin with vaccine treatment. It seems possible that the diuretic might assist in bringing the bacteriotropic substances, formed as a result of the vaccine, into contact with infected foci in the kidneys, and thus greatly increase the efficiency of the vaccine.

To summarise the results of treatment :—

(1) Lactic acid bacilli have failed to diminish the excretion of bacilli in fæcal cases.

(2) Attempts to cure typhoid bacilluria by acidifying the urine have not been successful.

(3) The administration of antiseptics has invariably brought about a decided diminution in the number of bacilli excreted, both by fæcal and urinary carriers. This effect is much more marked when the maximum "contact" of antiseptic with bacilli is brought about by combining the treatment with low diet and aperients in the case of "fæcal," and diuretics in the case of "urinary" carriers.

(4) The use of X-rays, especially in cases with gall-bladder symptoms, seems to have a definite beneficial result. I speak with diffidence, as my experience is limited to one such case; and it must be remembered that his history shows a long intermission in the passage of typhoid bacilli, a few months before the X-ray treatment was tried.

But the disappearance of bacilli from the stools on two occasions following the use of X-rays and freedom from recurrence for considerable periods after cessation of the treatment suggest that Private L. was really benefited by the X-rays; while the charts of the other two cases also point to improvement under this treatment.

(5) Lastly, it seems possible that treatment by a vaccine, though unsuccessful when tried alone in the cases now under discussion, would have a better chance if combined, in the case of urinary carriers with diuretics, and in gall-bladder cases with X-ray treatment.

As has often been pointed out by Sir Almroth Wright, a vaccine is more likely to be efficient when the local conditions are so altered as to permit of the fullest possible contact between the bacteriotropic substances in the blood and the bacteria involved.

TABLE A.

No.	Rank	Name	Corps	Stations where attacked	Date of attack	Situation of bacilli	If constant or otherwise	How case was disposed of	Remarks
7755	Private	P. R. L.	2nd N. Staffords.	Multan	May, 1908	Fæcal	Negative since arrival	To duty	Kept three months under observation before discharge.
11087	Private	S. V.	2nd Royal Fusiliers	Secunderabad	Dec. 13, 1908	Urinary and fæcal	Negative since arrival	To duty	Kept three months under observation before discharge.
45999	Gunner	L. W.	58th Battery R.F.A.	Neemuch	August 28, 1908	Fæcal	Constant	Invalided	On being offered choice of either further treatment or invaliding, chose the latter.
845	Lance-Serjeant	I.	1st East Kent	Aden	May, 1904	Urinary	Constant	Invalided	Ditto.
807	Corporal	P.	R.A.M.C.	Escourt (Natal)	Spring of 1900	Fæcal	Intermittent	To duty	For over two months free from typhoid bacilli before discharge.
33450	Bombardier	S.	77th Battery R.F.A.	Fyzabad	June, 1908	Urinary	Almost constant	Invalided	Elected to be invalided when offered alternative of further treatment, or discharge.
39674	Gunner	C.	R.H.A.	Meerut	March, 1908	Fæcal	Constant	Invalided	Ditto.
8354	Private	L.	1st Bedford Regt.	Jhansi	April, 1907	Fæcal (biliary)	Intermittent	Invalided	Ditto.
9503	Private	W.	1st Durham Lt. Infantry	Nazirabad	January 24, 1909	Fæcal (Para. A)	Intermittent	Still under observation	At Netley.

TABLE B.

No. 8554 Private L., 1st Bedforshire.

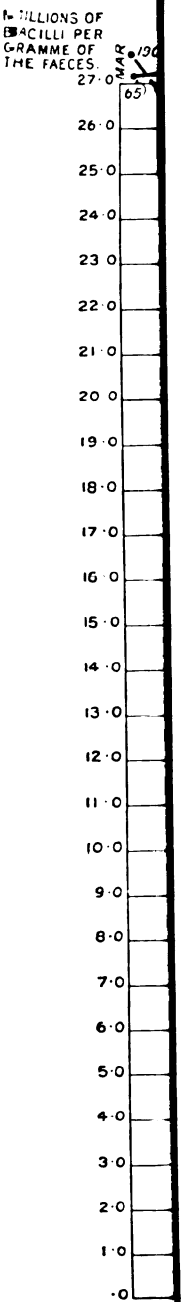
Month	Date	Fæces
July	29—7—09	+
August	3—8—09	+
	6—8—09	− *
	12—8—09	−
	16—8—09	−
	19—8—09	−
	24—8—09	−
	27—8—09	−
	30—8—09	−
September	6—9—09	−
	10—9—09	−
	13—9—09	−
	16—9—09	−
	20—9—09	+
	23—9—09	+
	27—9—09	−
	30—9—09	−
October	4—10—09	−
	7—10—09	+
	11—10—09	+
	15—10—09	+
	19—10—09	+
	21—10—09	+
	25—10—09	−
	28—10—09	−
November	1—11—09	+ †
	4—11—09	−
	11—11—09	−
Dec	6—12—09	−

X-Ray Exposures every 3rd day from 6—8—09 to 30—8—09

X-Ray Exposures every 3rd day from 20—10—09 to 15—10—09

* The stool examined on 6—8—09 was collected *before* the first X-ray exposure. It was diluted and examined *quantitatively*, so that it can only be called "negative" in a $\frac{1}{5000}$ dilution, the lowest dilution plated ($\frac{1}{5000}$ of a gramme of fæces). All other examinations were *direct qualitative* on "Drigalski" plates.

† Only four colonies found on two "Drigalski" plates.


MILLIONS OF
BACILLI PER
GRAMME OF
THE FAECES.
MAR
190
27·0
65
26·0
25·0
24·0
23·0
22·0
21·0
20·0
19·0
18·0
17·0
16·0
15·0
14·0
13·0
12·0
11·0
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6·0
5·0
4·0
3·0
2·0
1·0
·0

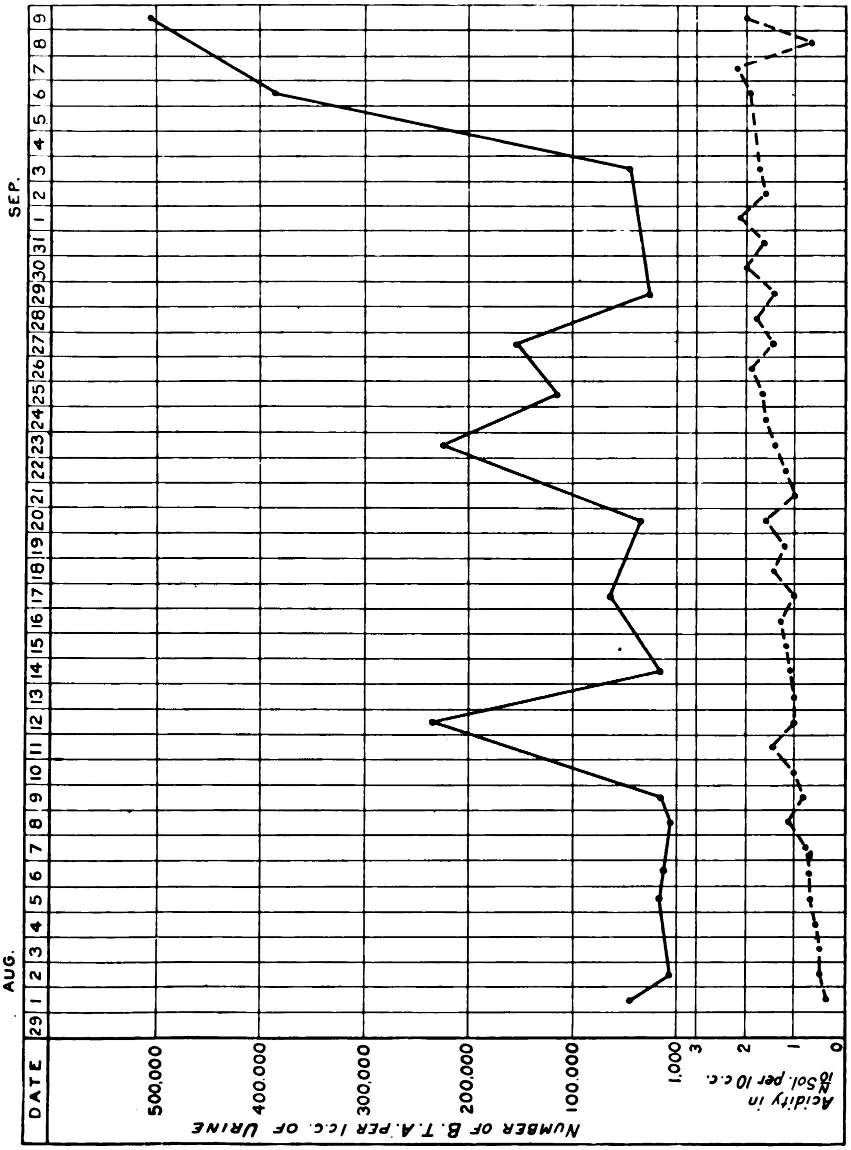

AUG.
SEP.
DATE
29 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 1 2 3 4 5 6 7 8 9
500,000
400,000
300,000
200,000
100,000
1,000
3
2
1
0
NUMBER OF B.T.A. PER 1 C.C. OF URINE
Acidity in N/10 Sol. per 10 c.c.

Chart 3.

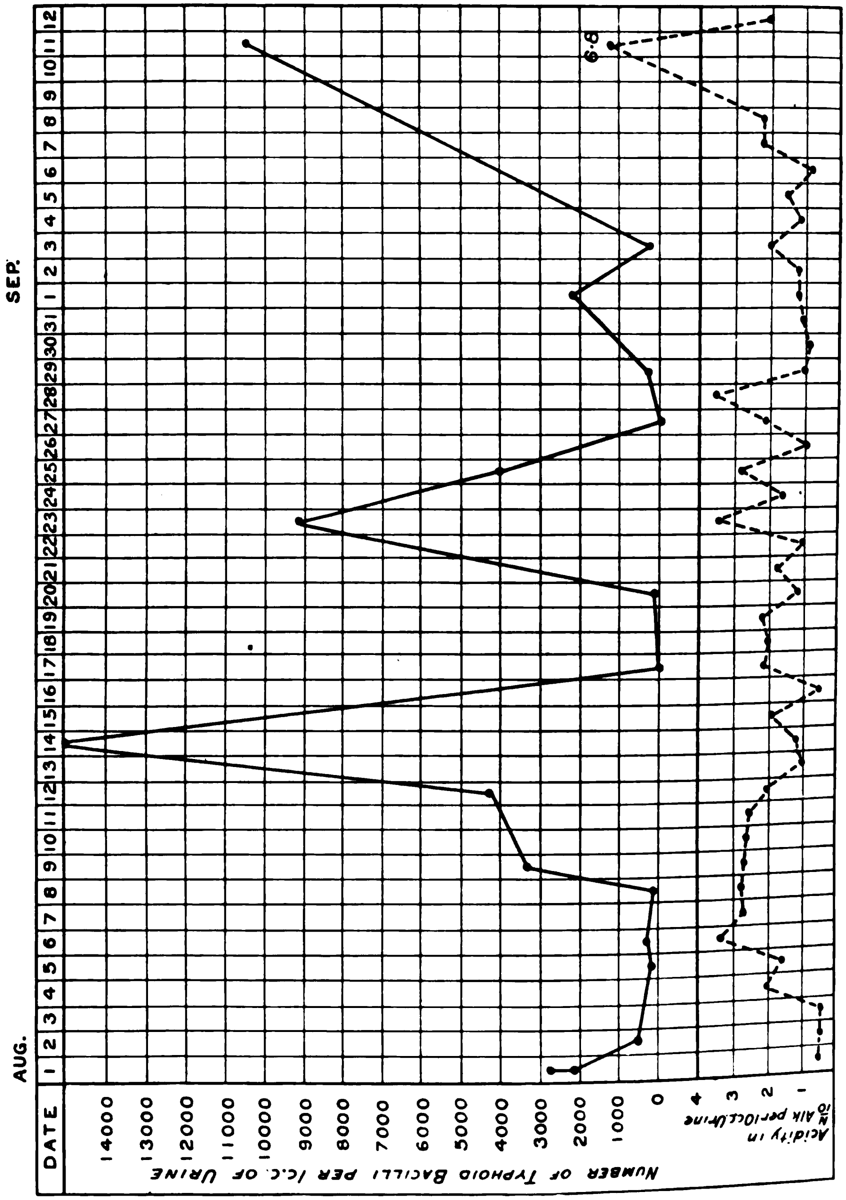

DATE
AUG.
SEP.
14000
13000
12000
11000
10000
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
NUMBER OF TYPHOID BACILLI PER 1 C.C. OF URINE
6·8

CHART 4.

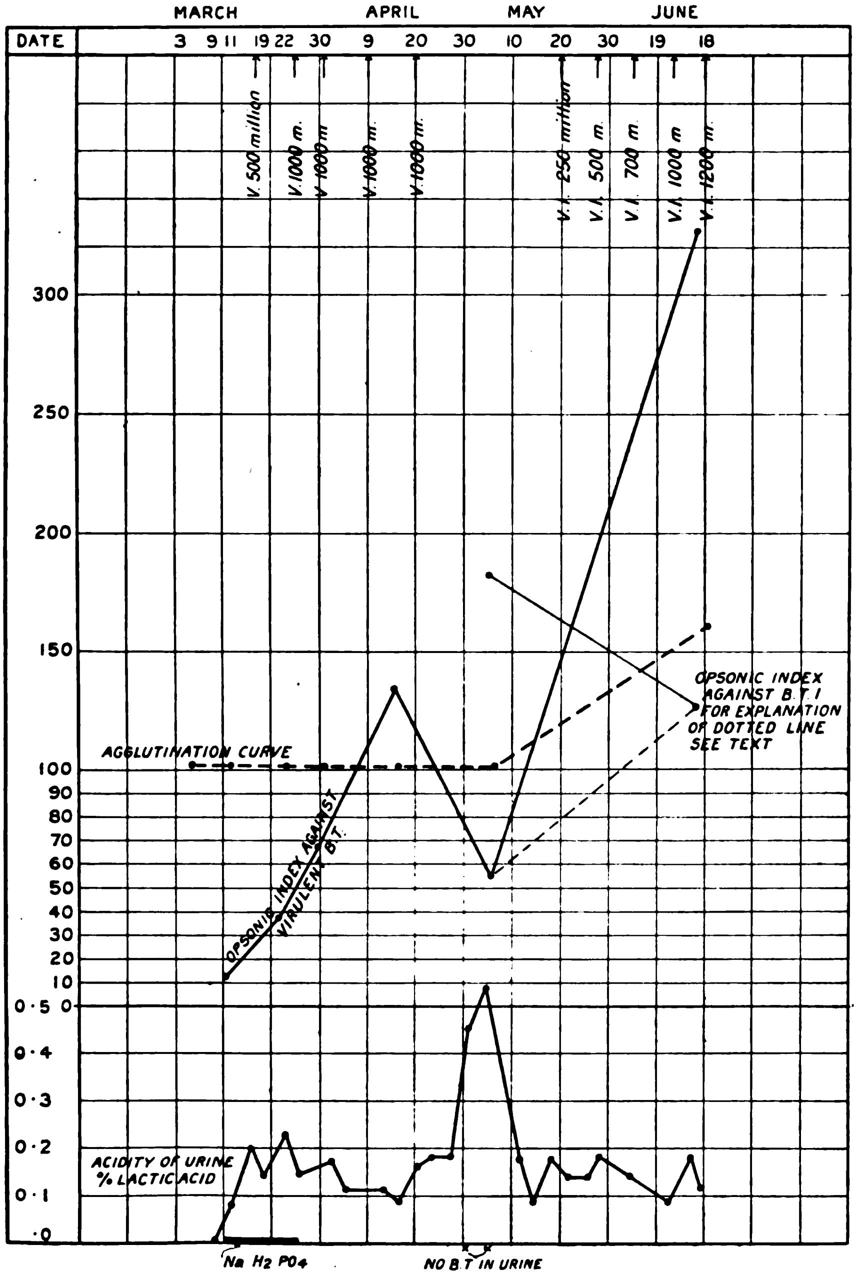

MARCH
APRIL
MAY
JUNE
DATE
3 9 11 19 22 30 9 20 30 10 20 30 19 18
V. 500 million
V. 1000 m.
V. 1000 m
V. 1000 m.
V. 1000 m.
V. I. 250 million
V. I. 500 m.
V. I. 700 m.
V. I. 1000 m
V. I. 1200 m.
300
250
200
150
100
90
80
70
60
50
40
30
20
10
0·5 0
0·4
0·3
0·2
0·1
·0
AGGLUTINATION CURVE
OPSONIC INDEX AGAINST VIRULENT B.T.
OPSONIC INDEX AGAINST B. T. I
FOR EXPLANATION OF DOTTED LINE SEE TEXT
ACIDITY OF URINE % LACTIC ACID
Na H2 PO4
NO B.T IN URINE

CHART 5.

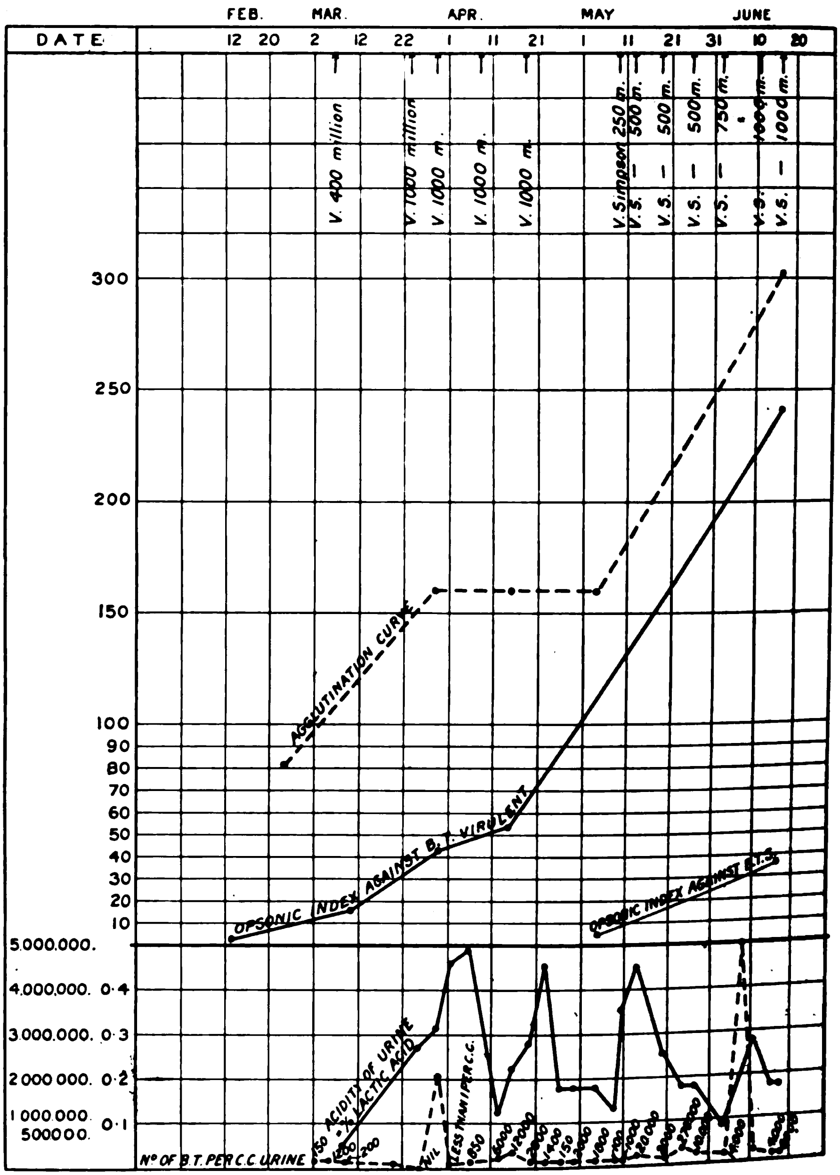
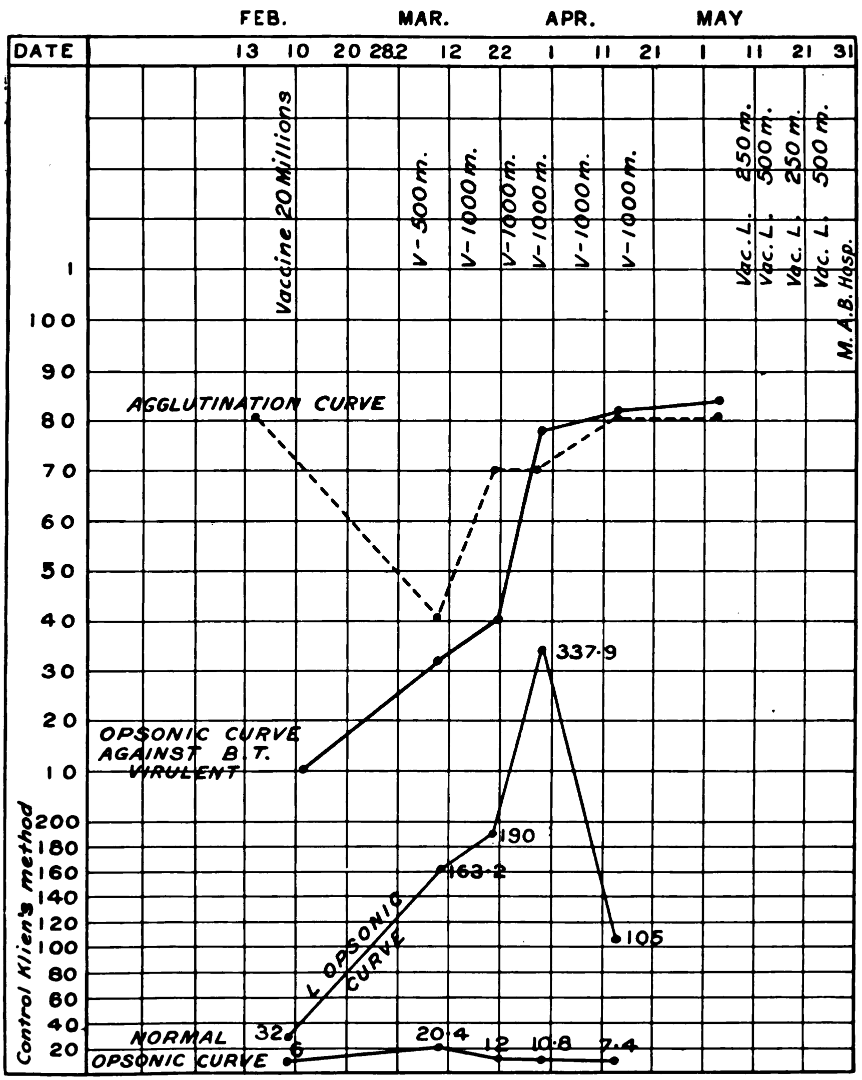

FEB.
MAR.
APR.
MAY
JUNE
DATE
12 20 2 12 22 1 11 21 1 11 21 31 10 20
V. 400 million
V. 1000 million
V. 1000 m.
V. 1000 m.
V. 1000 m.
V. Simpson 250 m.
V. S. 500 m.
V. S. 500 m.
V. S. 500 m.
V. S. 750 m.
V. S. 1000 m.
V. S. 1000 m.
300
250
200
150
100
90
80
70
60
50
40
30
20
10
5.000.000.
4.000.000. 0·4
3.000.000. 0·3
2 000 000. 0·2
1 000.000. 0·1
500000.
AGGLUTINATION CURVE
OPSONIC INDEX AGAINST B. T. VIRULENT
OPSONIC INDEX AGAINST B.T.S.
ACIDITY OF URINE = % LACTIC ACID
Nº OF B.T. PER C.C. URINE
NIL
LESS THAN 1 PER C.C.

Chart 6.



FEB.
MAR.
APR.
MAY
DATE
13 10 20 28 2 12 22 1 11 21 1 11 21 31
Vaccine 20 Millions
V-500 m.
V-1000 m.
V-1000 m.
V-1000 m.
V-1000 m.
V-1000 m.
Vac. L. 250 m.
Vac. L. 500 m.
Vac. L. 250 m.
Vac. L. 500 m.
M.A.B. Hosp.
1
100
90
80
70
60
50
40
30
20
10
200
180
160
140
120
100
80
60
40
20
AGGLUTINATION CURVE
OPSONIC CURVE AGAINST B.T. VIRULENT
337·9
190
163·2
105
L OPSONIC CURVE
NORMAL
OPSONIC CURVE
32·6
20·4
12
10·8
7·4
Control Klien's method

CHART 7.

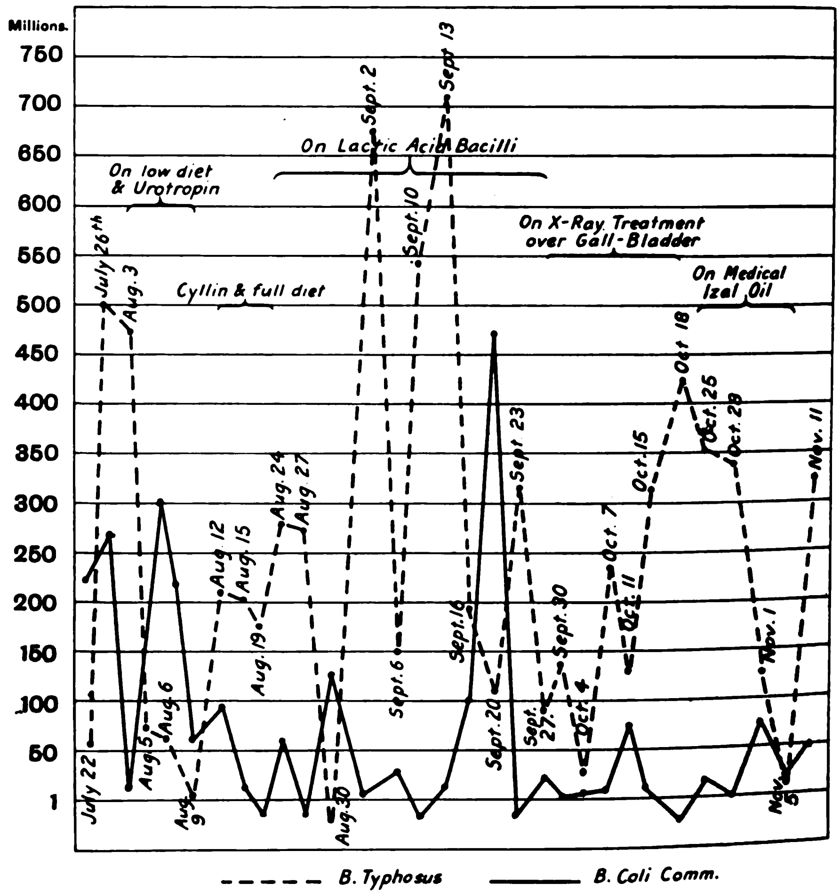

Millions.
750
700
650
600
550
500
450
400
350
300
250
200
150
100
50
1
On low diet & Urotropin
Cyllin & full diet
On Lactic Acid Bacilli
On X-Ray Treatment over Gall-Bladder
On Medical Izal Oil
July 22
July 26th
Aug. 3
Aug. 5
Aug. 6
Aug. 9
Aug. 12
Aug. 15
Aug. 19
Aug. 24
Aug. 27
Aug. 30
Sept. 2
Sept. 6
Sept. 10
Sept. 13
Sept. 16
Sept. 20
Sept. 23
Sept. 27
Sept. 30
Oct. 4
Oct. 7
Oct. 11
Oct. 15
Oct. 18
Oct. 25
Oct. 28
Nov. 1
Nov. 5
Nov. 11
B. Typhosus
B. Coli Comm.

CHART 8.

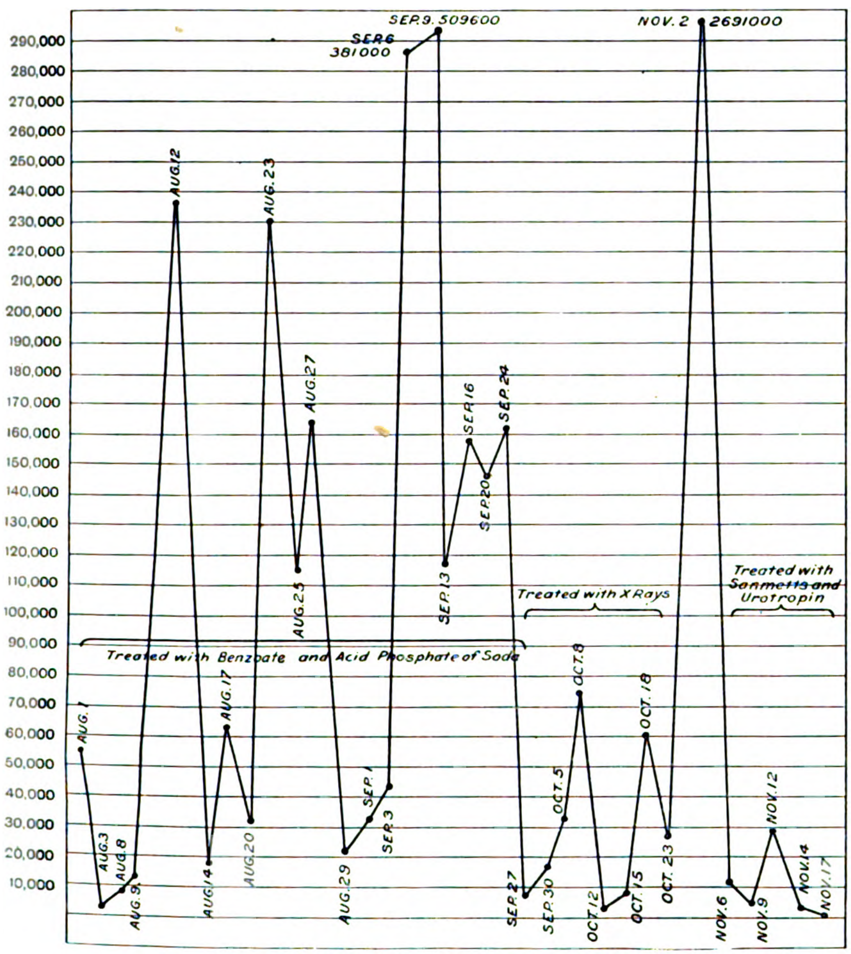
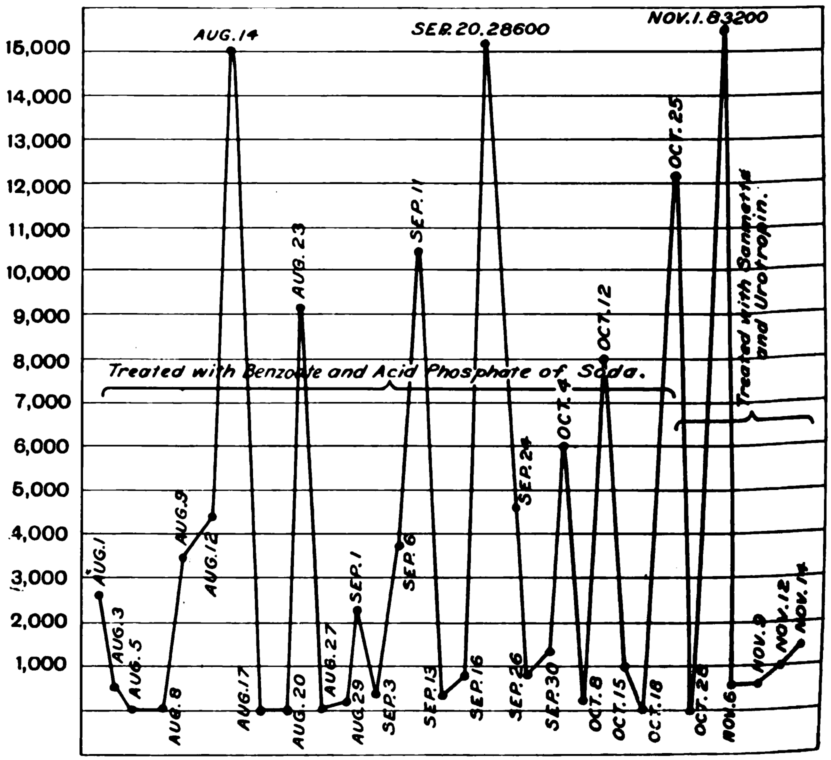

SEP.9. 509600
SEP.6
381000
NOV. 2
2691000
290,000
280,000
270,000
260,000
250,000
240,000
230,000
220,000
210,000
200,000
190,000
180,000
170,000
160,000
150,000
140,000
130,000
120,000
110,000
100,000
90,000
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
AUG.1
AUG.3
AUG.8
AUG.9
AUG.12
AUG.14
AUG.17
AUG.20
AUG.23
AUG.25
AUG.27
AUG.29
SEP.1
SEP.3
SEP.13
SEP.16
SEP.20
SEP.24
SEP.27
SEP.30
OCT.5
OCT.8
OCT.12
OCT.15
OCT.18
OCT.23
NOV.6
NOV.9
NOV.12
NOV.14
NOV.17
Treated with Benzoate and Acid Phosphate of Soda
Treated with X Rays
Treated with Sanmetts and Urotropin

CHART 9.



15,000
14,000
13,000
12,000
11,000
10,000
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
AUG.14
SEP. 20. 28600
NOV. 1. 83200
Treated with Benzoate and Acid Phosphate of Soda.
Treated with Sanmetto and Urotropin.
AUG.1
AUG.3
AUG.5
AUG.8
AUG.9
AUG.12
AUG.17
AUG.20
AUG.23
AUG.27
AUG.29
SEP.1
SEP.3
SEP.6
SEP.11
SEP.13
SEP.16
SEP.24
SEP.26
SEP.30
OCT.4
OCT.8
OCT.12
OCT.15
OCT.18
OCT.25
OCT.28
NOV.6
NOV.9
NOV.12
NOV.14

CHART 10.

A PRELIMINARY INQUIRY INTO THE PREVALENCE OF PARATYPHOID FEVER IN LONDON, WITH REMARKS ON BLOOD CULTURE IN FORTY-EIGHT CASES OF ENTERIC FEVER.[1]

By Major H. W. GRATTAN.
Royal Army Medical Corps.

The object of the research was to ascertain what proportion of cases of enteric fever are due to (1) the *Bacillus typhosus;* (2) the paratyphoid group; (3) other members of the typho-colon group.

The inquiry was commenced by studying races of the *B. typhosus* isolated from the dejecta of "typhoid patients."

After examining the dejecta from ten patients a case occurred in which both the *B. typhosus* and a paratyphoid bacillus were isolated from the same stool. I recovered the *B. typhosus*, and Captain Fawcus, who examined the same stool, reported the presence of a paratyphoid bacillus only. As I was proceeding on leave the next day Captain Fawcus kindly examined my original plate, and recovered both the *B. typhosus* and a paratyphoid bacillus.

Some days previously I had made cultures from the blood of this patient, and the typhoid bacillus only was recovered from each culture. Here was an example of a case that might easily have been wrongly diagnosed paratyphoid fever from an examination of the stool only. The paratyphoid bacillus was not present in 2½ cc. of the patient's blood.

The examination of stools was then discontinued, and the bacilli isolated by blood culture studied instead.

As enteric fever is not common in the London garrison, I had to search for material amongst the civil population. Considerable difficulty was experienced in obtaining cultures from patients in the first week of enteric fever, because cases are not as a rule sent to a fever hospital until late in the second week of the disease.

Out of sixty blood cultures taken from cases of enteric fever, or suspected to be suffering from enteric fever, only five were in the first week of the disease. Private G., a laboratory attendant, was

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[1] This paper (with remarks on blood culture in forty cases of enteric fever) was read at a meeting of the Pathological Section of the Royal Society of Medicine on November 4th, 1909, at the Royal Army Medical College.

one of the five, and he probably contracted the disease in the laboratory.

Technique.—In every case the blood was taken from a vein in the arm, and the amount of blood withdrawn is shown in Tables E and F. As a rule, when the culture medium was broth, flasks containing 500 cc. were used; but on one occasion I had to use broth in ordinary test-tubes, as it was the only form of medium available, 5 cc. of blood being distributed among eight test-tubes, each containing about 5 cc. of broth; a turbidity was noticed in only one of the eight tubes after four days' incubation at 37° C., and the *B. typhosus* was recovered from it in pure culture.

I also used broth containing 2·5 per cent. of bile salt in flasks of 250 cc., and also broth containing 2·5 per cent. of pure sodium taurocholate. Dunschmann has shown that the taurocholates favour the growth of the typhoid bacillus, while the glycocholates have an opposite effect. Ordinary nutrient broth was the medium used in the two positive cases shown in Table E.

Conradi's 10 per cent. glycerine peptone ox-bile was tried in five cases. The blood was distributed in small flasks or test-tubes, each containing 20 cc. of the medium. The results were very disappointing, only one being positive out of five. One of the negative cases was in the sixth day of the disease, and her temperature reached the normal line for the first time on the twenty-first day. The stools contained enormous numbers of the *B. typhosus*.

Two cc. of blood were withdrawn from a child aged 7; this was considered a reasonable amount of blood for culture purposes.

We know that 20 per cent. glycerine will sterilise a culture of the *B. typhosus*, and it is possible that a 10 per cent. solution may have a lethal effect on a typhoid bacillus whose vitality has been impaired by the bactericidal action of the blood.

On the other hand, the unfavourable results may have been due to the bile salts being broken up during sterilisation in the autoclave. In Cases 3, 4, and 5 the media were autoclaved, but from Case 6 onwards, when bile or media containing bile salts were used, the sterilisation was carried out at 100° C., either for two hours on one occasion, or for twenty minutes on three successive days.

Kaysers' plain sterile ox-bile was then tried. Kayser recommends 2·5 cc. of blood to be mixed with 5 cc. of bile. I used from 1 to 2·5 cc. of blood and distributed it in two tubes, each containing 20 cc. of bile; acting on the principle that by diluting

the blood we also dilute the bactericidal substances. I fail to see the object of crowding 2·5 cc. of blood into 5 cc. of bile. In one positive case the proportion of blood to bile was 1 to 80 (5 minims of blood to 20 cc. of bile). After incubating the mixture of blood and bile overnight, subcultures were then made on broth-agar and in certain selective media.

Results.—The combined results (various media) worked out as follows : In the first week 4 positive out of 5; second week, 19 positive out of 34; third and fourth weeks, 3 positive out of 10.

The plain bile method gave much the best results. They were as follows: In the first week 4 positive out of 4; second week, 17 positive out of 28; third and fourth weeks, 3 positive out of 10.

Blood cultures were made from 12 other suspected cases of enteric fever; they proved to be: (1) Tubercular meningitis; (2) miliary tubercle (autopsy in both these cases); (3 and 4) appendicitis; (5) thrombosis of lateral sinus and abscess of brain; (6) German measles; (7) middle-ear disease; (8) pleurisy; (9 and 10) influenza; (11) tubercular peritonitis; (12) abscess of liver. The blood of a typhoid carrier (Serjeant I.) was examined; 5 cc. of blood were withdrawn and were found to be sterile.

REMARKS ON THE CHARACTERS AND AGE OF THE BILE USED.

Seventeen different batches of ox-bile were used. Some were thin and watery and of a light-green colour, others were dark brown and gave a thick deposit after sterilising. The bile was not filtered before use.

When any batch was found to give an unusual proportion of negative results, it was tested to see if the *B. typhosus* would grow and multiply in it. In testing the bile I used the most recently isolated strain of *B. typhosus*, and inoculated the bile with the point of a platinum needle. The *B. typhosus* was recovered from each batch inoculated in this manner, the plate on which the subculture was made showing a confluent growth the following day.

A batch of bile (F) appeared to be at fault, as I had four negative results. It was tested in the manner mentioned above, and the *B. typhosus* was found to multiply in it. This same batch of bile was used in three other cases later, with two positive results.

Age of the Bile.—In Case 2 the glycerine-peptone bile was 2½ months old; it was noticed that it had diminished considerably in bulk owing to evaporation. Before it was used the loss due to evaporation was made good by adding sterile distilled water, and 1·3 cc. of blood was distributed among four flasks each

containing 20 cc. of the bile medium, and the *B. typhosus* was recovered from two of the four flasks.

In Case 8 (positive) the bile was 72 days old, but it had been kept in sealed glass capsules, which prevented any loss by evaporation. In Case 35 (also positive) the bile was sterilised on February 24th, 1909, and the blood culture was made on September 11th, 1909; the bile was over six months old. In this case the loss due to evaporation was made up by the addition of sterile distilled water. From these results it would appear that fresh ox-bile is not essential.

Characters of the Bacilli isolated from the Blood.—They were all Gram-negative bacilli or cocco-bacilli; twice I noticed long thread-like forms in the first subculture on agar. They all formed acid in glucose, mannite, and maltose, but produced no appreciable change in lactose, cane sugar, raffinose,[1] salicin, or inulin. No gas was produced in any of the media. All showed slight acid in litmus milk after 24 hours; after 14 days in the case of one strain the reaction became distinctly alkaline, and at the end of one month the reactions of 18 strains were acid and 2 alkaline. No clot was formed; no indol was formed after 14 days, and there was no liquefaction of gelatine at the end of a month.

The reactions with dulcite varied; 4 out of 24 strains fermented dulcite (acid only) within 14 days. Strains 9, 13, 17, and 37 produced distinct acid after 5, 4, 12, and 14 days at 37° C.

After three subcultures, strains 9 and 13 fermented dulcite in 24 hours. The subculture from 17 was sterile; the amount of acid produced had probably caused the death of the bacillus. After the second subculture, strain 37 produced acid in dulcite within 48 hours.

Twelve strains were kept in dulcite peptone for one month; at the end of that time the reactions of 8 were acid and 4 unchanged. The control tube showed no change except that its bulk had been reduced about one half as the result of evaporation.

As it is usually considered that a true typhoid bacillus does not ferment dulcite, special attention was paid to the effect of anti-typhoid serum on the dulcite fermenting strains. None of the strains produced any pellicle in broth, but grew with a uniform turbidity.

After 13 days the reaction of strain 35 was distinctly acid in raffinose peptone; after subculture from the acid raffinose to a fresh

[1] Strains 35 and 37 fermented raffinose.

raffinose tube, distinct acidity was produced in 48 hours. Twenty tubes of this batch of raffinose were then inoculated with twenty strains of *B. typhosus* (Nos. 8 to 43). No change was noted after 10 days; after 12 days the reactions of strains 35 and 37 only were acid. On a former occasion strain 37 had failed to ferment raffinose within 14 days. The two patients (35 and 37) were in the same ward, and the cultures were taken within 5 days of one another.

Agglutination with Anti-typhoid Serum.—Table C shows the result of testing with an antityphoid serum twenty-four strains isolated from the blood. The same serum was used for all the strains from No. 8 to No. 43, but as it was losing its agglutinating power a fresh serum was used for the remaining strains, Nos. 45, 46, and 48.

The table refers to the macroscopic test after twenty-four hours at room temperature. Before recording the results the sedimentation tubes were placed upside down for half an hour in order to distinguish mechanical sedimentation from true agglutination. In every case a control of each strain was put up and was found to be free from clumps. Distinct clumping was taken as the "end point." All the strains were agglutinated in dilutions of 1 in 1,000, and in the majority of cases the end point was not reached in this dilution.

The Effect of Anti-typhoid Serum on Dulcite Fermenting and Non-dulcite Fermenting Strains.—Three dulcite fermenters and one non-dulcite fermenter were tested with the same serum. The results are shown in Table D.

The dulcite fermenters showed a higher end point than the strain that had no action on dulcite. Distinct agglutination was noted in dilutions of 1 in 20,000 (two strains) and 1 in 8,000.

The end point of the non-dulcite fermenter was reached in 1 in 6,000. In other words, the dulcite fermenters are true typhoid bacilli, and the fact that any given strain of typhoid ferments, or does not ferment, dulcite is of little practical importance.

Feeble Growths of Recently Isolated Strains.—One strain when first isolated grew very slowly on Fawcus's modification of Conradi's brilliant green. The plate was inoculated direct from the mixture of bile and blood; nothing was seen until after three days' incubation, when the colonies appeared. A clean portion of the same plate was then inoculated with a laboratory strain of *B. typhosus*, and it showed up readily after incubation overnight. On another occasion a strain did not appear on this medium until

after forty-eight hours at 37° C. The plate had been inoculated with 1 c.c. of the blood and bile mixture, and six colonies of *B. typhosus* eventually appeared.

Atypical Strains of B. typhosus.—Two strains were met with which, when first isolated, were not agglutinated by an antityphoid serum.

The first was isolated from a suppurating joint. The patient, a girl aged 11, had an ordinary attack of enteric fever, and I isolated a typical strain of *B. typhosus* from the blood on the fifth day of the disease. During convalescence the right metacarpal phalangeal joint became inflamed and suppurated; the joint was freely opened, and Dr. Foord Caiger gave me an agar slope which he had inoculated with the pus. It contained a pure culture of a small Gram-negative bacillus. It was tested with an antityphoid serum in a dilution of 1 to 30; there was not a trace of clumping after one hour. The serum clumped other strains of *B. typhosus* readily in dilutions of 1 to 600. The bacillus gave the cultural reactions of *B. typhosus*, and after several subcultures it lost the power of resisting the antityphoid serum and agglutinated in dilutions from 1 to 40 up to 1 to 10,000.

The other non-clumping strain was obtained from the blood of Case 22. A culture taken on the thirteenth day proved to be sterile. I made another blood culture on the twenty-sixth day (relapse), and recovered a bacillus which was not agglutinated by an antityphoid serum diluted in 1 to 30 after forty-five minutes.

The serum diluted 1 to 100 agglutinated other strains of *B. typhosus* immediately. After the first subculture the strain was clumped by serum diluted in 1 to 20, but not completely after an hour and ten minutes; it was also clumped by the serum diluted 1 to 100, at the end of an hour, but the reaction was very imperfect.

The strain gave the cultural reactions of *B. typhosus*, and six weeks later it was agglutinated by an antityphoid serum in dilutions from 1 to 40 up to 1 to 3,000.

The resistance to agglutination of a bacillus when first isolated is, I believe, due to some substance which it produces in self-defence; the presence of this substance would explain how the bacillus is able to survive in the blood of a patient whose serum contains substances known to be antagonistic to the typhoid bacillus.

We know that a trypanosome can defend itself against the lethal effect of arsenic, and it is not unreasonable to presume that bacteria can protect themselves against the bactericidal properties

of the blood. Major Horrocks isolated a non-agglutinating strain *B. typhosus* from the spleen of a typhoid patient about ten years ago, and many workers have isolated similar non-agglutinating strains from typhoid patients since.

In conclusion I must thank Drs. Foord Caiger, Turner, Biernachi, Tabois, Cameron, Lister, and d'Amico for their kind co-operation and help.

My special thanks are due to Dr. Tabois. It would have been impossible for me to have collected this series of cases without his kind assistance.

TABLE A.

Serial Number	Name	Date of taking culture	Day of disease	Result	Widal
		1907			
1	Pte. K...	June 13	13	+	+
2	,, D...	Dec. 24	10	+	±
		1908			
3	S. T. ..	Nov. 27	10	–	
4	H. D. ..	,, ,,	11	–	
5	Mabel H.	Dec. 3	6	–	
6	Lieut. A.	,, 4	14	–	
7	Sarah D.	,, 10	15	–	
8	C. S. ..	,, ,,	13	+	
9	G. Y. ..	,, 31	10	+	
		1909			
10	D. G. ..	Jan. 4	11	+	±
11	W. N. ..	,, 8	14	+	
12	Helen W.	,, ,,	5	+	
13	Pte. G...	Feb. 2	6	+	±
14	R. N. ..	,, ,,	7	+	±
15	P. M. ..	,, 8	13	–	+
16	Nurse B.	,, 9	12	+	
17	F. D. ..	,, 12	10	+	±
18	C. D. ..	,, ,,	2nd week	+	+
19	I. E. ..	,, 17	10	–	±
20	Sarah C.	Mar. 3	8	–	+
21	Nurse C.	,, ,,	13	–	+
22	,,	Apr. 2	26	+	
23	C. S. ..	,, 21	6	+	±
24	C. D. ..	May 17	15	+	±

Serial Number	Name	Date of taking culture	Day of disease	Result	Widal
		1909			
25	C. E. ..	June 2	15	–	+
26	V. S. ..	,, 17	11	+	±
27	Ada E. ..	July 12	17	–	±
28	D. E. ..	,, 13	13	–	+
29	Annie O.	,, 19	9	+	±
30	C. E. ..	Aug. 9	15	–	+
31	B. Y. ..	,, 11	11	–	+
32	G. G. ..	Sept. 8	14	+	+
33	Mrs. R. L.	,, ,,	12	–	+
34	Rosina R. Y.	,, 9	3rd—4th week	–	+
35	R. Y. ..	,, 11	17	+	+
36	Lily E...	,, 13	25	–	+
37	C. N. ..	,, 15	8	+	±
38	R. L. ..	,, ,,	21	–	+
39	Eliza C..	Oct. 22	2nd week	–	±
40	Leah V..	,, 25	9	+	±
41	M. T. ..	,, ,,	..	–	±
42	Sarah G.	Nov. 10	12	+	+
43	Ada P...	,, ,,	14	+	±
44	Edith B.	,, 12	12	–	±
45	Victoria K.	,, 24	11	+	+
46	Emma B.	,, ,,	9	+	±
47	B. N. ..	,, 26	17	–	+
48	G. T. ..	Dec. 1	9	+	+
49	Rose B...	,, ,,	16	–	+

Under the column "Widal" + indicates a complete reaction with *B. typhosus*, the serum being diluted in 1—30 or 1—50, with a time limit of half or one hour respectively. The tests were made with blood taken at the same time as the blood culture.

Where a remark is not entered, an observation was not made when taking the culture. All the above cases gave a positive reaction to *B. typhosus* during some period of the disease, with the exception of Cases 19 and 44.

+ or – under the column "Result" indicates that *B. typhosus* was or was not recovered from the blood.

TABLE B.—CULTURAL CHARACTERS OF TWENTY-SIX STRAINS OF *Bacillus typhosus* ISOLATED FROM THE BLOOD OF TWENTY-SIX CASES OF ENTERIC FEVER IN LONDON.

Number of cultures:	1	2	8	9	10	11	12	13	14	16	17	18	22	23	24	26	29	32	35	37	40	42	43	45	46	48
Glucose	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Lactose	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−
Cane sugar	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−
Mannite	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Maltose	..	..	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Dulcite	..	..	−	+	−	−	−	+	−	−	+	−	−	−	−	−	−	−	−	+	−	−	−	−	−	−
Raffinose	..	..	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	+	+	−	−	−	−	−	−
Inulin	..	..	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−
Salicin	..	..	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−
Litmus milk	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	o	+	+	+	+	+	+	+	+	+	+
Indol...	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−
Gelatine	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−	−

.. = test omitted.

\+ = acid.

− = no appreciable change, no formation of indol, and no liquefaction of gelatine.

Under litmus milk + = slight acid and no clot.

o = alkalinity preceded by slight acidity (no clot).

The chart refers to reactions after 14 days' incubation, with the exception of gelatine which was kept under observation for 30 days. No. 48 was only watched for 22 days.

Summary.

(1) Cultures were made from the blood of sixty suspected cases of enteric fever; twelve of these proved not to be enteric (tubercle, appendicitis, influenza, middle-ear disease, &c.). The blood cultures were positive in twenty-six out of the forty-eight cases of enteric.

(2) The *B. typhosus* was the only member of the typho-colon group which was recovered from the blood of the twenty-six positive cases.

(3) A diagnosis of paratyphoid fever based on an examination of the stool only is unreliable.

(4) Plain sterile bile (Kayser's method) gave the best results.

(5) The action of the *B. typhosus* on dulcite is variable; a recently isolated true typhoid bacillus may ferment dulcite.

(6) A strain of *B. typhosus* when first isolated fermented raffinose in thirteen days, and in forty-eight hours after subculture.

(7) A recently isolated true typhoid bacillus may fail to be agglutinated by an antityphoid serum.

TABLE C.—Agglutinins (Macroscopic test, 24 hours at room temperature).

Date of observation	Date when isolated	Number of culture	1—40	1—100	1—200	1—400	1—800	1—1,000	1—2,000	1—3,000	1—4,000	1—10,000
1909	1908											
June 24	Dec. 10	8	+	+	+	+	+	+	+	+	*	
,, ,,	,, 31	9	+	+	+	+	+	+	+	+	+	
	1909											
	Jan. 4	10	+	+	+	+	+	+	+	+	+	
June 24	,, 8	11	+	+	+	+	+	+	+	+	...	
,, ,,	,, ,,	12	+	+	+	+	+	+	+	+	+	
,, ,,	Feb. 2	13	+	+	+	+	+	+	+	+	+	
,, ,,	,, ,,	14	+	+	+	+	+	+	+	+	+	
,, ,,	,, 9	16	+	+	+	+	+	+	+	+	+	
,, ,,	,, 12	17	+	+	+	+	+	+	+	+	+	
,, ,,	,, ,,	18	+	+	+	+	+	+	+	+	+	
,, 22	April 2	22	+	+	+	+	+	+	+	+	±	
,, 24	,, 21	23	+	+	+	+	+	+	+	+	+	
,, ,,	May 17	24	+	+	+	+	+	+	+	+	+	
,, 22	June 17	26	+	+	+	+	+	+	+	+	+	
,, ,,	—	Stock *B. typhosus* (R)	+	+	+	+	+	+	+	+	±	
,, 24	,, ,,	*B. coli*	–	–	–	–	–	–	–	–	–	
Sept. 30	July 19	29	+	+	+	+	+	+	+	...	+	+
,, ,,	Sept. 8	32	+	+	+	+	+	+	+	...	+	±
,, ,,	,, 11	35	+	+	+	+	+	+	+	...	+	±
,, ,,	,, 15	37	+	+	+	+	+	+	+	...	±	±
Nov. 25	Oct. 25	40	+	+	+	+	+	+	±	...	–	
,, ,,	Nov. 10	42	+	+	+	+	+	+	±	...	–	
,, ,,	,, ,,	43	+	+	+	+	+	+	±	...	–	
Dec. 3	,, 24	45	+	+	+	+	+	+	+	...	+	
,, 4	,, ,,	46	+	+	+	+	+	+	+	...	+	
,, 10	Dec. 1	48	+	+	+	+	+	+	+	...	+	

+ = Distinct agglutination; ± = slight agglutination; – = no agglutination; ... = no observation; * = tube broken.

TABLE D.—AGGLUTINATION OF THREE DULCITE FERMENTERS (NOS. 9, 13, AND 17) AND ONE NON-DULCITE FERMENTER, NO. 8.

Number of culture	Dilutions of Serum									Action on dulcite
	1-100	1-1,000	1-2,000	1-4,000	1-6,000	1-8,000	1-10,000	1-20,000	1-40,000	
9	+	+	+	+	+	+	+	+	−	+
13	+	+	+	+	+	+	−	−	−	+
17	+	+	+	+	+	+	+	+	−	+
8	+	+	+	+	+	−	−	−	−	−

\+ = distinct agglutination.
− = no agglutination.
Under dulcite + = formation of acid.
,, ,, − = no change.

TABLE E.

Glycerine Peptone Ox-bile, 10 per cent.					Broth.					
Serial number	Day of disease	Amount of blood	Result	Interval	Serial number	Day of disease	Amount of blood	Result	Remarks	Interval
2	10	1·3 cc.	+	20	1	13	5 cc.	+	40 cc. broth in 8 test-tubes	65
3	10	1 ,,	−	60	7	15	2·5 ,,	−	500 cc. broth, 250 cc. bile-salt broth	90
4	11	1 ,,	−	70	8	13	1·5 ,,	+	500 cc. broth ..	100
5	6	2 ,,	−	120	15	13	1·5 ,,	−	500 cc. broth ..	105
6	14	1 ,,	−	15	34	3rd—4th week	2·5	−	250 cc. taurocholate broth	45
					36	25	1·5	−	500 cc. broth ..	45

TABLE F.—Pure Sterile Ox-bile.

1st Week.

Serial number	Amount of blood	Result	Interval
12	1 cc.	C+	105
13	1 ,,	C+ D−	10
14	1 ,,	C+ D+	90
23	2·5 ,,	G+ C−	15 hours

3rd and 4th Weeks.

Serial number	Amount of blood	Result	Interval
22	2·5 cc.	C+	45
24	2·5 ,,	H+ H−	45
25	2·5 ,,	H− H−	35
27	2·5 ,,	I− I−	50
30	3 ,,	J− J−	15 hours
34	2·5 ,,	J−	45
35	5 ,,	F+ F+ J+	45
38	2·5 ,,	L− L−	15 hours
47	2·5 ,,	M− M−	No interval 15 hours
49	2·5 ,,	L−	,, ,,

2nd Week.

Serial number	Amount of blood	Result	Interval
8	1 cc.	A+	100
9	1 ,,	B+	45
10	1·75 ,,	B+ B−	40
11	1 ,,	C+	95
15	1 ,,	D− D−	105
16	2·5 ,,	D+ D−	60
17	2·5 ,,	D+ D+	40
18	2·5 ,,	D+ D−	50
19	1·5 ,,	E−	40
20	2·5 ,,	F− F−	45
21	2·5 ,,	F− F−	10
26	2·5 ,,	H+ H−	50
28	2·5 ,,	I− J−	60
29	2·5 ,,	J+ J+	45
31	2·5 ,,	J− J− F−	15 hours
32	2·5 ,,	F+ J+	,, ,,
33	3 ,,	F− F− J−	,, ,,
36	1 ,,	F−	50
37	2 ,,	K+ K+	40
39	4 ,,	L− L−	13
40	4 ,,	L+ L+	15 hours
41	1 ,,	L−	,, ,,
42	3 ,,	L+ M+	,, ,,
43	3 ,,	L+ M−	,, ,,
44	4 ,,	L− M−	40
45	2·5 ,,	M+ M−	No interval 15 hours
46	4 ,,	M+ M+	No interval 15 hours
48	2·5 ,,	I+	,, ,,

The letters denote different batches of ox-bile. Example: Serial number 43, L+M− means that the blood (3 cc.) was distributed among two phials of bile—batches L and M,—and that the *B. typhosus* was recovered from L and not from M.

The figures under the column "Interval" denote the time in minutes that elapsed between the withdrawal of the blood and the incubation of the culture. When the cultures were not incubated until the following day the interval was approximately 15 hours.

In Cases 45, 46 and 47 one tube of bile was kept at 37° in a water bath, and was taken to the bedside of the patient, while the other tube was not warmed. The warm mixture of blood and bile was incubated at once, while the other culture was not incubated until the following day.

In Case 45 *B. typhosus* was recovered from the warmed culture which was incubated at once, and not from the culture which was incubated the following day. *B. typhosus* was recovered from both the warm and cold cultures in Case 46, and both cultures were sterile in Case 47.

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ENTERIC FEVER EPIDEMIC, KILWORTH, 1909.

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Royal Army Medical Corps.

THE epidemic was divided into two series of cases; in the interval few troops were in camp. All those attacked, except Private S. (No. 20), were connected with an officers' or serjeants' mess, and all, with the same exception, used milk supplied by a farmer named O'Neil. The very much larger number of officers and men in camp using milk from other dairies were unaffected.

The epidemic has been definitely traced to the milk supplied by O'Neil, which was infected by the dairymaid at the farm, who has now been proved to have been a "carrier" since her attack of enteric fever in 1903. She came to live at the farmhouse on February 1st, 1909, but since the previous November she had given many odd days' work, as she lived less than a mile distant from the farm. In December, 1908, O'Neil's two sisters both died of an acute fever within a fortnight of each other. The doctor, who saw them late in the illness, returned both deaths as due to pneumonia, but tells me now, in the light of our present knowledge, he believes that enteric fever was probably the primary cause of the illness. A carpenter working at the camp, and using O'Neil's milk, developed enteric fever on February 7th, 1909. O'Neil's other sister, who was married and lived on a farm about a mile away, was ill with enteric fever in September, 1909. There was much communication between the two houses. A civilian post-office clerk sickened with enteric fever early in September, 1909; the post office also used O'Neil's milk as its supply.

Adjoining O'Neil's farmhouse were the iron huts which he let for the season to a small theatrical company. They were absent on tour from about July 10th to August 2nd, as most of the troops were out of the camp during this time. About July 17th a child of one of the actors became ill whilst on tour, and though no doctor was called in, yet the illness was believed to be enteric fever. The child was convalescent on the return of the company to camp, but the brother was then sick, and was removed to hospital suffering from enteric fever on August 7th. The family received milk at the farm.

Previous History of the Dairymaid.—In October, 1903, she contracted enteric fever and was in hospital for three months, the attack being a very severe one. At the time she was employed as dairymaid at a farm. She returned after about six months to her work there, and soon afterwards the farmer and his child developed enteric fever. In 1905, for about a year, she was nursemaid to a baby in Fermoy, the only other members of the family being the father and mother. She rarely did any cooking except for the baby, and I am unable to trace any definite illness here except that the baby was very delicate for a short time, but soon recovered completely. In 1906 she was employed as a dairymaid to a farmer at Glanworth, near Kilworth. Soon after her arrival the farmer's child became ill, and also, about the same time, the farmer and his wife, and a labourer's wife and child who lived in the farmyard. The farmer's other two children, who were absent at a boarding school during the illness in the family, came home on vacation six months afterwards, and both developed enteric fever. The doctor in attendance told me that all were typical attacks of enteric fever; he was entirely at a loss at the time to trace the continued infection, but he said the farmer himself thought his misfortunes were connected with the dairymaid, and he got rid of her.

There had been a good deal of enteric fever around the district for some years, and I have been able to trace a possible connection between the dairymaid and some of these cases. Notification of disease is imperfect; if the dispensary doctor be called in at all, it is late in the illness, when secondary symptoms have perhaps appeared, and he is reluctant for many reasons to report infectious disease. I had, therefore, extreme difficulty in tracing the cases. The girl denied ever having had any illness, and refused all information. Suspicion fell on her when by order of the Administrative Medical Officer, who suspected a "carrier," I examined by Widal's reaction the blood of all O'Neil's household and all the mess servants connected with the Royal Munster Fusiliers, as her blood, in a dilution of 1—100 agglutinated the *B. typhosus*. She refused to further co-operate in the investigations necessary to prove the excretion of the specific bacillus, but after some time she was admitted to hospital, and then I was able to obtain samples. The *B. typhosus* was definitely isolated from her urine by Professor McWeeney, of Dublin; Professor Moore, of Cork; Captain Fawcus, of the Royal Army Medical College, London; and also by the writer.

The garrison officers' mess opened for the season about April 29th, 1909. Cases occurred in connection with the mess

at different dates. The messing was in the hands of a caterer who said the milk was boiled. O'Neil supplied all the milk.

The South Lancashire Regiment had a small detachment mess at Kilworth supplied by O'Neil from June 2nd to July 2nd. Two officers and two mess servants were attacked. The milk was not boiled.

The mess of the Connaught Rangers was supplied by O'Neil from August 7th to the 23rd. Only one mess waiter was attacked; he admits he drank the milk on its arrival at the mess, before it was boiled. There appears to be no doubt that the milk in this mess was systematically boiled as ordered. The messing was under strict regimental control.

The Royal Munster Fusiliers officers' and serjeants' messes used O'Neil's milk from July 21st to August 22nd; eight officers, two serjeants, and two mess waiters were attacked. The messing had been handed over to Messrs. Dickeson and Co. on the arrival of the regiment in camp, and three cooks were changed during the period. The regimental authorities state they did not commence to boil the milk until after the second order, dated August 7th. The mess servants state it was boiled after Private D., the kitchen man, went sick on August 16th, but there are reasons for believing that at no time was the boiling of the milk systematically carried out. It would appear that the intense infection of the mess which apparently was in action about the middle of August, and the results of which appeared in the numerous cases admitted about September 1st, was due to Private D., who was doing duty in the mess for a few days before going to hospital on August 16th, when he reported sick with fever.

O'Neil also supplied milk to the officers' and serjeants' mess of Special Reserve of the Munster Fusiliers from June 6th to June 23rd. There were no cases amongst the officers and serjeants. He supplied the garrison serjeants' permanent mess from May 12th to July 4th; the members of the mess averaged about eight serjeants. There were no ill results. He did not supply any other troops practically throughout the season. I have gone through his daily sales as given in his account book. The average strength of troops in the camp during July was about 700, but on August 22nd the strength reached 1,700; so it will be seen that the milk supplied by O'Neil was but a small percentage of that used by other officers and men who were not affected. The milk supplied to the men was either condensed or boiled.

The general sanitary conditions of the camp were satisfactory. O'Neil's farm had water piped to the farmyard from the military

reservoir. There had been no cases of enteric fever amongst the troops at the camp for many seasons, and O'Neil supplied milk to the troops from the first occupation of the camp.

The fact that some cases of enteric fever had already occurred in July caused special orders to be issued regarding the boiling of milk. It may be interesting to give these in detail, as the epidemic proves that the medical recommendations were not carried out.

No. 75. Camp Orders.—Kilworth, July 30th, 1909.

2. Milk.—"The medical officer in charge of troops recommends that all milk other than condensed milk, used in camp, should be boiled before issue."

No. 82. Camp Orders.—Kilworth, August 7th, 1909.

4. Milk.—Camp order No. 2 of 30th ult. is republished for information.

"The medical officer in charge of troops recommends that all milk, other than condensed, used in camp should be boiled before use.

"*This recommendation applies with equal force to officers' messes.*"

No 84. Camp Order.—Dated, August 13th, 1909.

2. Milk.—The following letter from Specialist Sanitary Officer, C.D., to the Administrative Medical Officer, Cork, S.D., is published for information and guidance :—

"I have the honour to recommend that particular attention be directed to the fact that enteric fever and diphtheria are at present in the Mitchelstown district, consequently care should be taken to insure a sufficient supply of pure water accompanying troops manœuvring about Kilworth, and *all milk supplies should invariably be boiled.*"

Orders. Brigade and Divisional Training, 1909.

Sanitary.

4. Milk.—All milk, except tinned, will invariably be boiled before use.

Conclusions.

(1) The epidemic was caused by the milk supplied by a farmer named O'Neil.

(2) That this milk was infected by the dairymaid at the farm, who acted as a carrier.

(3) That the milk was drunk unboiled by those attacked, contrary to definite and repeated orders.

The following cases occurred among the troops :—

ENTERIC FEVER EPIDEMIC, KILWORTH, 1909.

No.	Name	Regiment	Onset	Remarks
1	Capt. C. ..	E. Yorks. ..	24.5.09	Inspector of Musketry. Had tea in garrison mess about end of April.
2	Lieut. D. ..	Sherwoods ..	8.7.09	Lived at garrison mess (O'Neil's milk).
3	Pte. R... ..	,, ..	17.7.09	Mess waiter at garrison mess (O'Neil's milk).
4	Lieut. P. ..	S. Lancs. ..	12.7.09	The officers lived at a small det. mess, and used O'Neil's milk; the privates acted as waiters.
5	,, M. ..	,, ..	17.7.09	
6	Pte. C... ..	,, ..	15.7.09	
7	,, A... ..	,, ..	17.7.09	(Died.)
8	Capt. B. ..	R.M.F. ..	26.8.09	Regimental mess, O'Neil's milk.
9	Lieut. H. ..	R.A.M.C. ..	23.8.09	Garrison mess, O'Neil's milk.
10	,, W. ..	R.W.F. ..	24.8.09	
11	,, M. ..	R.M.F. ..	28.8.09	Regimental mess, O'Neil's milk.
12	,, D. ..	,, ..	31.8.09	
13	,, S. ..	,, ..	1.9.09	
14	,, H. ..	,, ..	31.8.09	
15	,, E. ..	,, ..	1.9.09	
16	,, C. ..	,, ..	30.8.09	
17	Capt. S. ..	,, ..	3.9.09	
18	Pte. D... ..	,, ..	16.8.09	Kitchen man (officers' mess), had been ill a few days on duty, and may have infected the mess.
19	,, J.	,, ..	2.9.09	Mess waiter.
20	,, S.	,, ..	30.8.09	Regimental duty; the only case that cannot be traced to the milk.
21	Lance-Serjt. S.	,, ..	23.8.09	(Died.) Members of serjeants' mess using O'Neil's milk.
22	Serjt. B. ..	,, ..	21.8.09	
23	Pte. G... ..	Con. Rang. ..	27.8.09	Mess waiter, admits he drank milk before it was boiled.
24	Child B. ..	R.E... ..	19.8.09	Visited Kilworth Camp and drank milk at O'Neil's farm on August 10th.

NOTES ON SOME CASES OF ENTERIC FEVER IN WHICH THE *BACILLUS PARATYPHOSUS* A WAS ISOLATED FROM THE BLOOD OR EXCRETA.

By Captain D. HARVEY, V.H.S.
Royal Army Medical Corps.

During the "Enquiry into Enteric Fever in India," conducted by the Central Research Institute, six cases of paratyphoid infection were demonstrated by cultural methods; four of these were due to the *Bacillus paratyphosus* A (Brion and Kayser), and two to the *B. paratyphosus* B (Schotmüller); notes on these cases will be found in the "Scientific Memoirs of the Government of India," New Series, No. 32.

Mention is made of these cases as they are the first cases of paratyphoid infection, based on cultural examination, recorded in India, and also the first two in the series occurring in men whose regiments were stationed in Lucknow (Oxford Light Infantry and Durham Light Infantry). In the cold weather of 1908-9, Captain J. Morrison, I.M.S., isolated by blood culture from two cases of fever in the Station Hospital, Lucknow, a bacillus, subcultures of which when sent to the laboratory for identification proved to be the *B. paratyphosus* A. Both the patients were in the Durhams (see Case 10 of the present series).

All the cases now to be recorded, with two exceptions, occurred in men whose regiments were stationed in Lucknow, or who had recently come from that station to a camp in Manora, four miles from the civil station of Naini Tal. This camp accommodated 150 men, 100 of the Royal Dragoons and 50 of the King's Own Regiment. The detachment of the Royal Dragoons supplied five cases, and the detachment of the King's Own Regiment one case.

Case 0.—Private F., 1st Royal Dragoons, not inoculated. This was the first case of fever admitted to the Station Hospital, Naini Tal, from Manora camp during the season 1909. It was proved by blood cultures to be enteric fever due to the *B. typhosus*, and is inserted here for comparison with the other cases. The man arrived at Manora camp with his detachment on April 6th, 1909, and was admitted to hospital on April 8th, 1909; he stated that he felt ill before leaving Lucknow, and had evidently contracted the disease there. On April 8th, 1909, 5 cc. of blood were withdrawn from a vein in his arm and placed in 2 cc. of Conradi's bile medium; from this a pure culture of the *B. typhosus* was obtained.

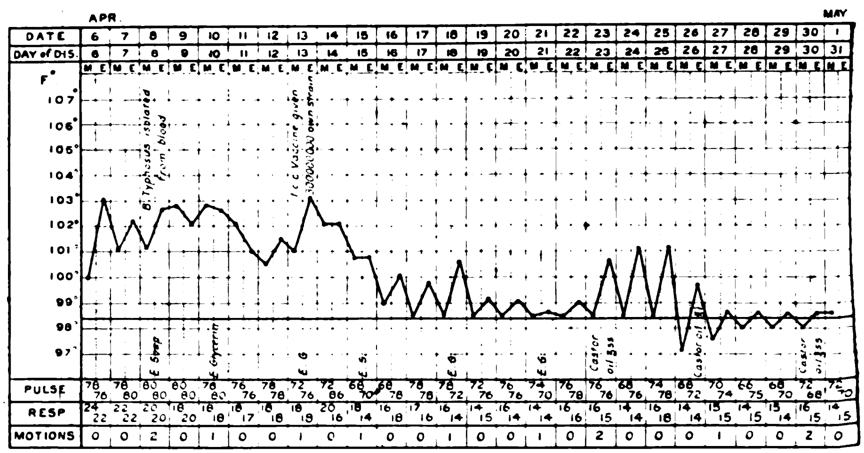
His Widal reaction on April 13th, 1909, was as follows:—

	Dilution of serum: 1—20	1—40	1—100	1—200	1—400
Stock *B. typhosus*	+	+	±	Trace	*Nil*
Own strain	+	+	±	±	Trace
B. Paratyphosus A	Trace	—	—		

Agglutination first appeared in the typhoid tubes.

As a control the bacillus isolated from the blood of this case was tested with the serum of three enteric convalescents; the following results were obtained:—

		Dilution of serum: 1—20	1—40	1—100
No. 1 serum.	F.'s bacillus	+	+	+
	B. paratyphosus A ..	—	—	—
No. 2 ,,	F.'s bacillus	+	+	±
	B. paratyphosus A ..	—	—	
No. 3 ,,	F.'s bacillus	+	+	±
	B. paratyphosus A ..	—	—	



CASE O.

The man passed through a mild but typical attack of enteric fever, there were no abdominal symptoms, and one or two spots were observed.

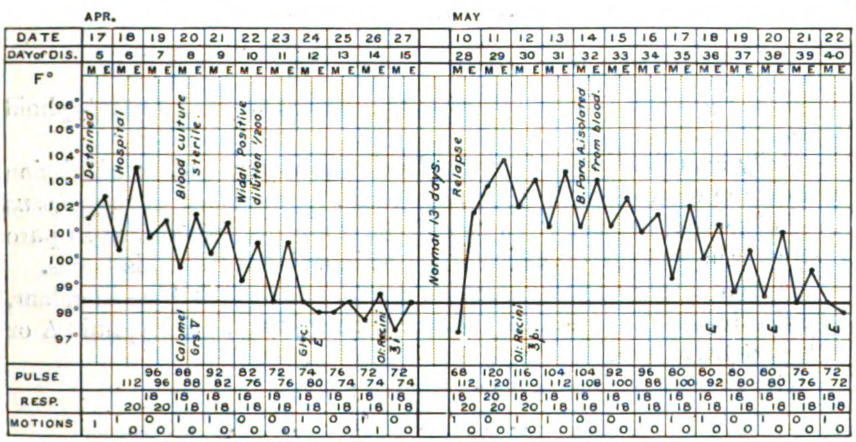
On April 9th, 1909, a vaccine was prepared from the bacillus isolated from the patient's blood by the simple method employed by Lieutenant-Colonel Semple, Director Central Research Institute. A twenty-four-hour growth on an agar tube is taken and sufficient of the growth is removed by means of a platinum wire and beaten up in 5 cc. of sterile normal salt solution to give an opacity equal to 300 million bacilli per cc.; 5 per cent. carbolic acid is added to

sterilise the vaccine, which is ready for use in a few hours; no heat is employed.

One dose of 300 million bacilli was given on April 13th, 1909. There was a slight local reaction, but no general reaction beyond what is shown on the chart. He had a slight recrudescence of fever, but a second dose of vaccine was not given.

The urine and fæces of this man were examined daily for a week from the day of admission; the *B. typhosus* was never recovered. Three months later his excreta were examined for a fortnight, but again with negative results.

Case 1.—Lance-Corporal H., 1st Royal Dragoons, not inoculated. This man arrived at Manora camp on April 6th, 1909, and reported sick on April 15th; he stated that he had not felt well for two or three days. He was admitted to the Station Hospital, Naini Tal, on April 18th, having a temperature of 103° F., pulse rate of 112, and severe pains in the head and neck; he had no abdominal symptoms.



Case 1.

On April 28th, the eighth day of disease, 5 cc. of blood were taken from a vein in the arm and placed in bile, but the culture proved to be sterile. His serum, in a dilution of 1—200, gave on the same day a positive, though not complete, reaction with the *B. typhosus*; it was not tested against the *B. paratyphosus* A. His temperature dropped to normal on April 24th, the twelfth day of disease, but on May 12th it suddenly rose to 102° F., the pulse being 120. On the third day of this relapse 5 cc. of blood

were again taken, and a pure culture of the *B. paratyphosus* A was obtained. His serum reaction on this day was as follows :—

Dilution of serum :	1—20	1—40	1—100
Stock *B. typhosus*	+	+	±
,, *B. paratyphosus* A	Trace	–	–

These tests were made in sedimentation tubes, and it was noted that the 1—20 tube of *B. paratyphosus* A was the first to show agglutination macroscopically; this rapid action of the specific agglutinins was present in every case of this series when tested during the fever.

This was a very mild case of fever followed by a more severe relapse, spots were not present and the bowels were constipated throughout; severe headache was present, both in the initial attack and during the relapse, but his mind was clear; the pulse rate was more rapid than one would expect in true uncomplicated enteric fever. On June 9th, three weeks after his temperature had become normal, his blood serum gave the following reaction :—

Dilution of serum :	1—20	1—40	1—100
Stock *B. typhosus*	+	+	±
,, *B. paratyphosus* A	Trace	–	
Own strain	Trace	–	

Again the first tubes to show agglutination were the paratyphoid ones.

Daily examination of fæces and urine were made after admission and during convalescence; no sign of *B. typhosus* or *paratyphosus* were observed, but the day after admission a bacillus almost in pure culture was present on Conradi plates inoculated from his fæces.

The colonies were large, rather dense, and bright blue in colour, but the bacilli did not clump either with typhoid, paratyphoid A or B high titre serum.

The sugar reactions were as follows :—

Lactose	*Nil*	5 days.
Glucose	Acid and gas	,,
Saccharose	*Nil*	,,
Litmus milk	Acid ; no clot	Acid ; no clot.
Neutral red agar	Gas ; slight fluorescence.	

Morphology : A motile bacillus, non-Gram staining.

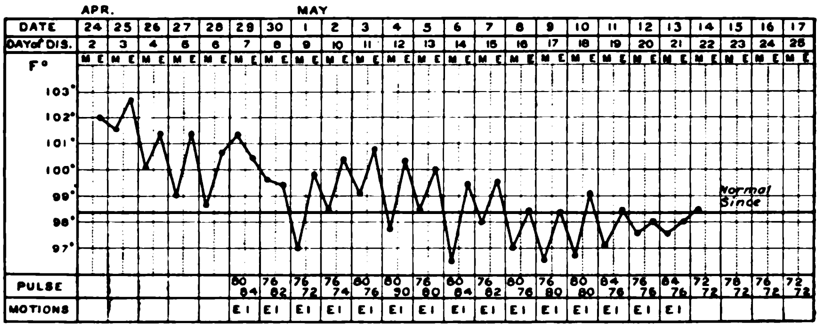
A similar bacillus is occasionally met with in pure culture in the fæces of men in perfect health.

Case 2.—Miss X., not inoculated. This lady arrived at Naini Tal on April 12th, 1909, and fever began on April 22nd; she was admitted to the Civil Hospital on April 29th; her serum reaction on this day was as follows :—

	Dilution of serum:	1—20	1—40	1—100
Stock *B. typhosus*	.. .. ..	±	Trace	—
,, *B. paratyphosus* A	.. ..	Not tested.		

On May 4th her serum was again tested and reacted as follows:—

	Dilution of serum:	1—20	1—40	1—100
Stock *B. typhosus*	.. .. ..	±	Trace	—
,, *B. paratyphosus* A	.. ..	±	±	Trace.



CASE 2.

Clumps were seen in the *B. paratyphosus* A tubes, dilutions 1—20 and 1—40, in twenty minutes; there were no clumps visible in the typhoid tubes in two hours. This was a very mild case of fever, there being no symptoms beyond headache and constipation.

No attempt was made to cultivate the bacillus either from the blood or excreta, but the case is inserted here in view of the serum reaction.

Case 3.—Serjeant B., Highland Light Infantry. This man was admitted to the Station Hospital, Lucknow, on June 3rd, 1909. A blood culture was taken on June 6th by Captain J. Morrison, I.M.S., and a bacillus was isolated in pure culture; a subculture from this was sent to this laboratory and proved to be the *B. paratyphosus* A.

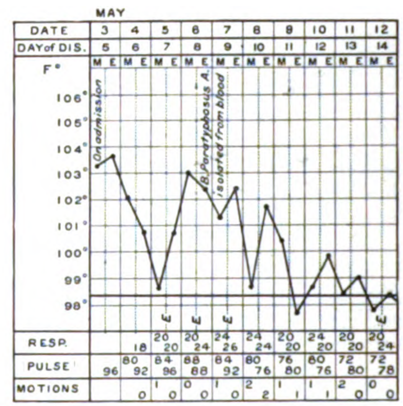
During convalescence the excreta was examined in Naini Tal, to which station he had been transferred, with negative results.

His serum reaction on October 21st was:—

	Dilution of serum:	1—20	1—40	1—100
Stock *B. typhosus*	.. .. ..	±	Trace	—
,, *B. paratyphosus* A	.. ..	±	∓	Trace.

Another serjeant of the same regiment was admitted to hospital in Lucknow at the same time as Serjeant B., and from his blood

the *B. paratyphosus* A was isolated, on May 15th, 1909, during the initial fever, and on June 12th during a relapse. It is almost inconceivable that these two men living together in the same mess could have been infected by different strains of the bacillus, yet Serjeant B.'s fever lasted ten days after admission to hospital and the other serjeant's fever lasted sixty days.



CASE 3.

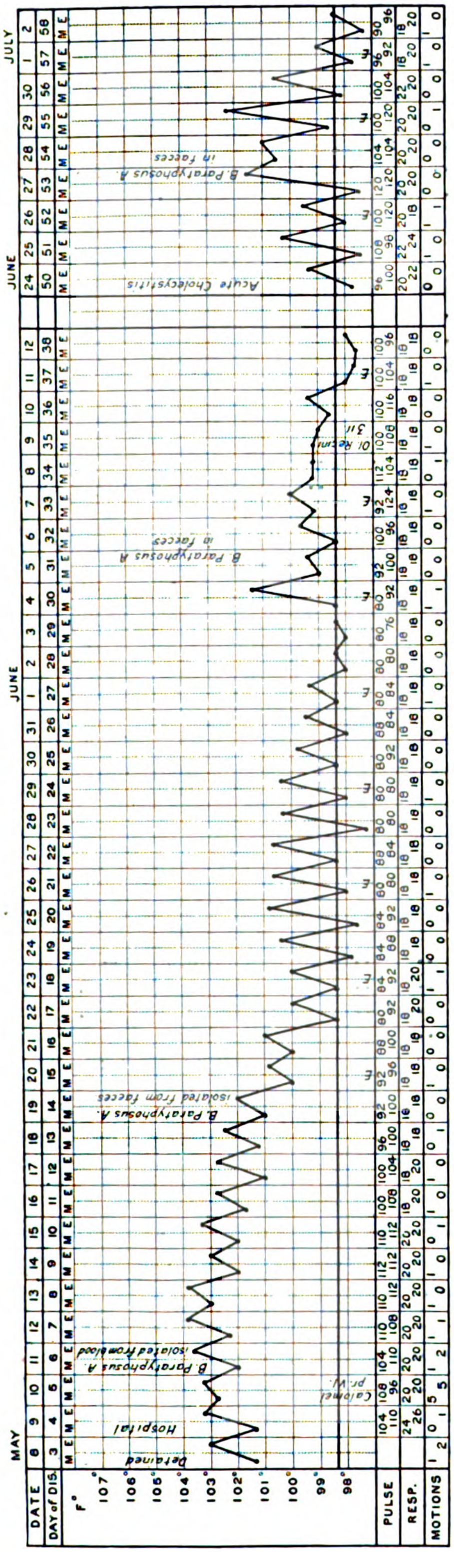
Case 4.—Private P., 1st Royal Dragoons, not inoculated. This was a second case from Manora camp. He first felt ill on May 6th, 1909, and was admitted to the Station Hospital, Naini Tal, on May 9th, complaining of headache and constipation. It may be noted that, as in Case 1, the pulse-rate at the commencement of the fever was over 100 per minute. On May 11th, the fifth day of the disease, the *B. paratyphosus* A was isolated from the blood; on this occasion 3 cc. of blood were placed in 20 cc. of bile medium, and 2 cc. of blood were also put into 100 cc. of broth; the bile culture was sterile, but a pure culture of the *B. paratyphosus* A was obtained from the broth.

His serum reaction on this day was :—

	Dilution of serum : 1—20	1—40	1—100
Stock *B. typhosus*	+	+	±
„ *B. paratyphosus* A	±	∓	Trace.

Again the first tube to show clumping was the 1—20 *B. paratyphosus* A.

On May 13th it was first noticed that rose spots, typical in



CASE 4.

appearance and in large numbers, were appearing on the abdomen and flanks; there was also some tympanites.

On May 14th, at the end of the second week of the disease, *B. paratyphosus* A was isolated from the fæces for the first time, although the excreta had been examined daily since admission.

On June 4th, a sudden and acute attack of cholecystitis developed with vomiting of bile; a pear-shaped swelling appeared at the lower margin of the liver, which was acutely painful and also tender on pressure. The *B. paratyphosus* A was present in the fæces almost in pure culture.

On June 14th the cholecystitis subsided.

On June 24th a second acute attack of cholecystitis developed with fever and pain and tenderness over the gall-bladder; the *B. paratyphosus* A was present in the fæces.

In order to differentiate between the specific and group agglutinins the following absorption experiments were performed. Private P.'s serum untreated:—

Dilution of serum:	1—20	1—40	1—100	1—200	1—400
Stock *B. typhosus*	+	+	+	±	∓
B. paratyphosus A, own strain ..	±	∓	Trace.		

Private P.'s serum after absorption for one hour with his own bacillus. Serum reaction :—

Dilution of serum:	1—20	1—40	1—100	1—200	1—400
Stock *typhoid*..	∓	Trace	–	–	–
B. paratyphosus A, own strain ..	Trace	Trace	–	–	–

Private P.'s serum after absorption for one hour with the *B. typhosus*. Serum reaction :—

Dilution of serum:	1—20	1—40
Stock *B. typhosus*	Trace	–
B. paratyphosus A, own strain ..	±	Trace.

It will be noted that the agglutinins for the *B. typhosus* were almost removed by absorption with the *B. paratyphosus* A isolated from the patient's blood; but if these agglutinins had been due to an infection with the *B. typhosus* then absorption with *B. paratyphosus* A should have only slightly reduced the agglutination titre. Absorption with the *B. typhosus* slightly reduced but did not completely remove agglutinins for the *B. paratyphosus* A.

In another case, referred to in the Report already mentioned, which was proved by culture to be a double infection with the *B. typhosus* and the *B. paratyphosus* A, absorption with the latter bacillus had no effect on the agglutinins for the former.

On August 10, Private P.'s serum gave the following reactions with his own bacillus and the strains isolated from cases 7 and 8:—

Dilution of serum:	1—20	1—40	1—100
Stock *B. paratyphosus* A	±	Trace	–
Private D.'s strain	±	±	Trace.
Own strain	±	±	Trace.
Private F.'s strain	+	±	∓
Stock *B. typhosus*	+	+	±

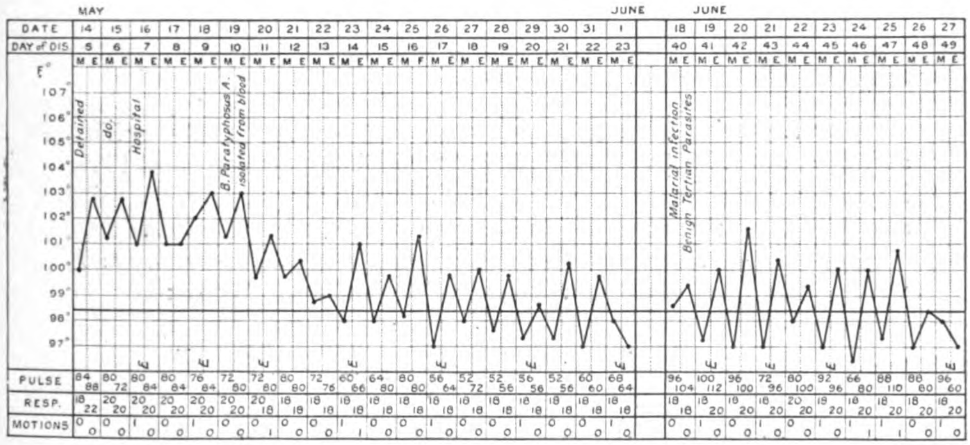
This man proceeded home time expired in October, 1907. Before leaving he still complained of pain and tenderness in the gall-bladder region, but the later examinations of his fæces were negative.

Case 5.—Private G., 1st Royal Dragoons, inoculated once on March 16th, 1907. This man was admitted to the Station Hospital, Naini Tal, on May 16th, 1909, being the third case from Manora Camp. The pulse-rate was slow and slight tympanites, with constipation, was present. On July 19th, the tenth day of the disease, the *B. paratyphosus* A was isolated from the blood by bile culture. After admission several films of blood were examined for malarial parasites, but with negative results; it may be said

here that the same procedure was followed in all the cases of this series with a like result, and no quinine was given with the one exception noted below.

On June 18th, his temperature having been normal for seventeen days, he began to get rises of temperature in the evenings and benign tertian malarial parasites were found in his blood; quinine by the mouth did not control the fever, but two injections stopped it. His serum reaction on June 9th was:—

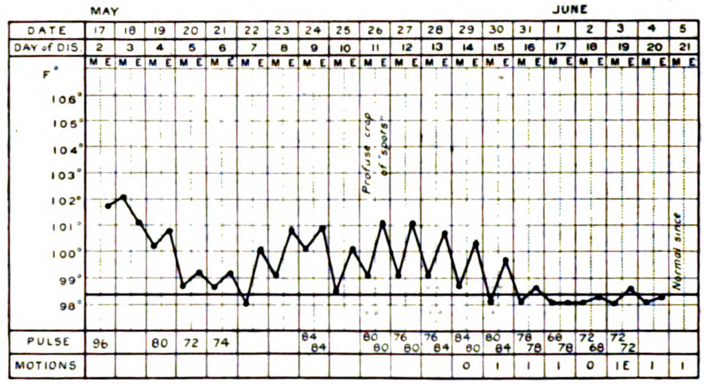
Dilution of serum:	1—20	1—40	1—100	1—200
B. typhosus	+	±	∓	∓
B. paratyphosus A	±	∓	Trace	Trace.



Case 5.

In this case the pulse-rate was slow, but he was not admitted to hospital till the seventh day of the disease. As will be seen from the chart, the pulse-rate was rapid during the fever due to the malarial infection. Urine and fæces were examined, but with negative results.

Case 6.—Lieutenant P., Indian Medical Service, inoculated (Civil Hospital). This officer arrived in Naini Tal, from Lucknow, on May 17th, 1909, suffering from fever, and gave a history of having had fever for some days previously. A capsule of blood was taken from a finger on May 23rd, and the serum having been drawn off for a Widal examination, the clot was placed in 10 cc. of bile medium and well beaten up; the following day a pure culture of the *B. paratyphosus* A was obtained from the bile. The serum reaction was *negative*. Lieutenant P. attributed his illness to an infection in the laboratory in Lucknow where he had been working with cultures of this bacillus. The excreta were not examined.



CASE 6.

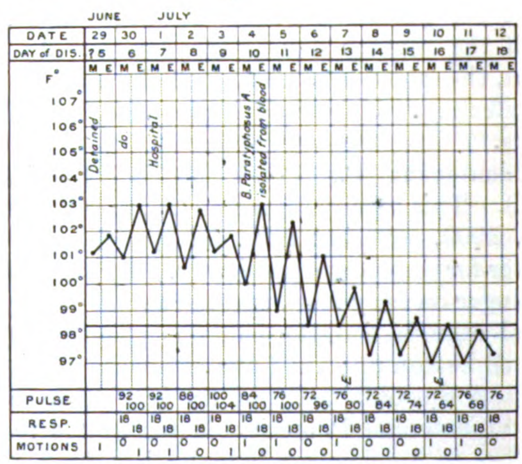
Case 7.—Private D., 1st Royal Dragoons, inoculated on May 15th and May 26th, 1909. This man was admitted on July 1st, 1909, being the fourth case from Manora Camp. He had a very mild attack of fever; there were no spots or abdominal symptoms.

On July 4th, the tenth day of disease, the *B. paratyphosus* A was isolated from the blood. Serum reactions on July 9th:—

Dilution of serum:	1—20	1—40	1—100
B. typhosus	+	Trace	–
B. paratyphosus A	–	–	

July 29th, 1909:—

B. typhosus	±	Trace.
B. paratyphosus A	Trace	–
Own strain	–	–



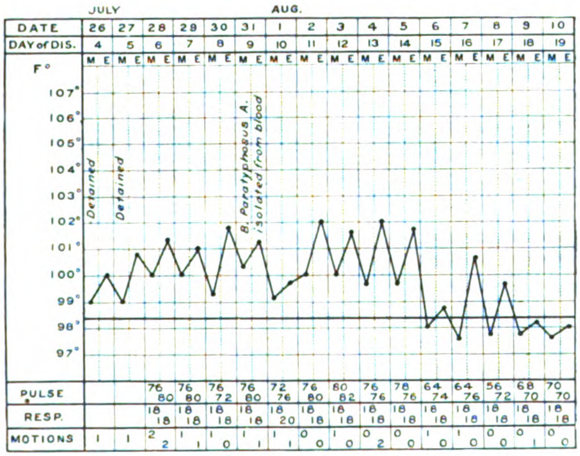
CASE 7.

These results are interesting, as although the *B. paratyphosus* A had been isolated from his blood and his temperature had come down to normal; he gave a negative or negligible Widal reaction on two occasions, and although he had been inoculated twice in May he gave only a very low reaction with *B. typhosus*, considerably lower than other men of this series who had not been inoculated at all.

On October 13th, one month after his temperature had become normal, his serum was again tested, emulsions of his own bacillus, the stock paratyphoid A, and the strains isolated from Cases 4 and 8 being used.

Dilution of serum:	1—20	1—40	1—100
Stock *B. paratyphosus* A	Trace	—	—
Private F.'s strain	±	Trace	—
Own strain	Trace	—	—
Private P.'s strain	±	Trace	—
Stock *B. typhosus*	Trace	—	

This result shows that even the slight reaction to *B. typhosus* obtained on July 29th was produced by his fever and not by the inoculation.



CASE 8.

Case 8.—Private F., King's Own Regiment, inoculated January 29th and February 17th, 1909. This fifth case from Manora Camp was admitted to the Station Hospital, Naini Tal, on July 18th, with fever, headache, pains in the back and constipation; the pulse was slow and steady, and face flushed; there were no abdominal symptoms.

After the first day or two in hospital he never felt ill; on July 27th, the ninth day of illness, the *B. paratyphosus* A was isolated from the blood. Convalescence was rapid and uninterrupted. Serum reaction on August 1st, the tenth day of the disease:—

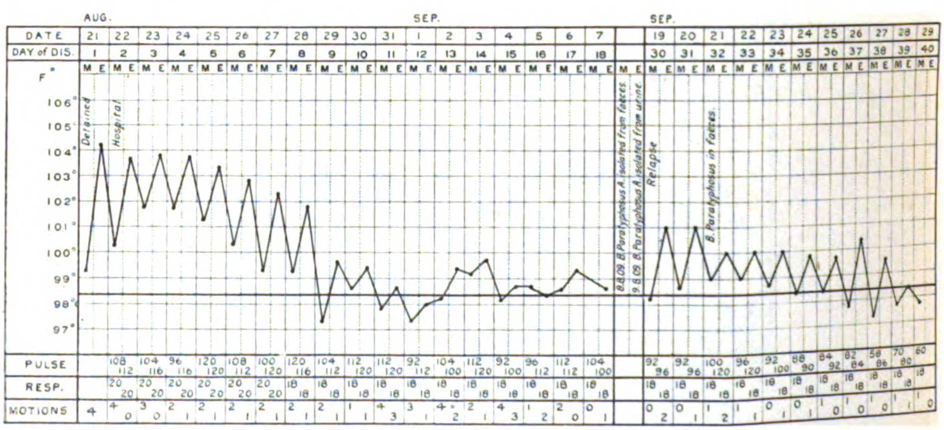
Dilution of serum:	1—20	1—40	1—100
Stock *B. typhosus*	±	±	Trace.
Stock *B. paratyphosus* A	Trace	Trace	–
Own strain	–	–	–

Agglutination appeared first in the A tubes.

On August 13th, the temperature having been normal for four days, his blood serum gave the following reactions:—

Dilution of serum:	1—20	1—40	1—100
Stock *B. paratyphosus* A	±	±	∓
Private D.'s strain	±	±	∓
Own strain	±	±	∓
Private P.'s strain	±	±	∓
Stock *B. typhosus*	±	Trace	–

It will be noted that this man's serum agglutinated at this stage, the stock *B. paratyphosus* A, and the strains isolated from Cases 4 and 7 in higher dilutions than the *B. typhosus*, the reverse of the other cases. Urine and fæces were examined daily with negative results.



Case 9.

Case 9.—Private B., 1st Royal Dragoons, inoculated on September 26th and October 7th, 1909. This man was admitted to the Station Hospital, Naini Tal, on August 22nd, 1909, being the sixth case from Manora Camp. He had been ill for a week with cough

and vomiting; his temperature had been taken every evening and had been found to be normal. On admission he had a temperature of 100° F. and a pulse-rate of 104. He had also some cough with congestion at the bases of both lungs, and diarrhœa was present.

On the fifth and ninth days of disease 2 cc. of blood were taken and cultivated in broth and bile, and proved sterile on both occasions.

On August 8th, the nineteenth day of the disease, diarrhœa continued, a profuse crop of rose spots was present, and the abdomen was tympanitic. On this date the *B. paratyphosus* A was isolated from the fæces and also from the urine. The pulse-rate was rapid throughout the disease, and although the temperature became normal the diarrhœa persisted. There was a slight relapse from September 21st to September 29th, 1909, and the *B. paratyphosus* A was present in very large numbers in the fæces but had disappeared from the urine. Serum reaction on September 4th :—

Dilution of serum :	1—20	1—40	1—100
Stock *B. typhosus*	+	+	±
Private F.'s strain	±	∓	∓
Private P.'s strain	±	∓	..
Private D.'s strain	+	±	∓

Case 10.—Private W., Durham Light Infantry (not inoculated). This man left Lucknow on January 14th, 1909, went sick at Nasirabad on January 22nd, and was admitted to hospital there on January 23rd suffering from fever and "chills"; he had no headache, the pulse was full and bounding; there were no abdominal symptoms. A blood-film was examined for malaria with negative results.

On January 28th the tongue was brown and dry and pulse dicrotic; no abdominal tenderness or headache was present.

On January 31st he passed a pea-soup stool.

On February 8th his temperature was normal in the morning, and he had a typical typhoid look.

On February 9th slight hæmorrhage occurred, and the patient became weaker. A crop of rose-pink spots appeared on the flanks and abdomen.

On February 12th a Widal positive reaction was obtained. (No note of dilution or of paratyphoid reaction.)

On March 1st the temperature still remained high, but no malarial parasites were found in the blood.

On March 16th he had a relapse; tongue was clean and moist.

These notes are extracted from the case sheet drawn up by

Captain A. S. Arthur, R.A.M.C., under whose care this man was at Nasirabad.

He arrived at the Convalescent Depôt, Naini Tal, on June 1st as an enteric convalescent. His serum reaction on June 12th was:—

Dilution of serum:	1—20	1—40	1—100
Stock *B. typhosus*	+	+	±

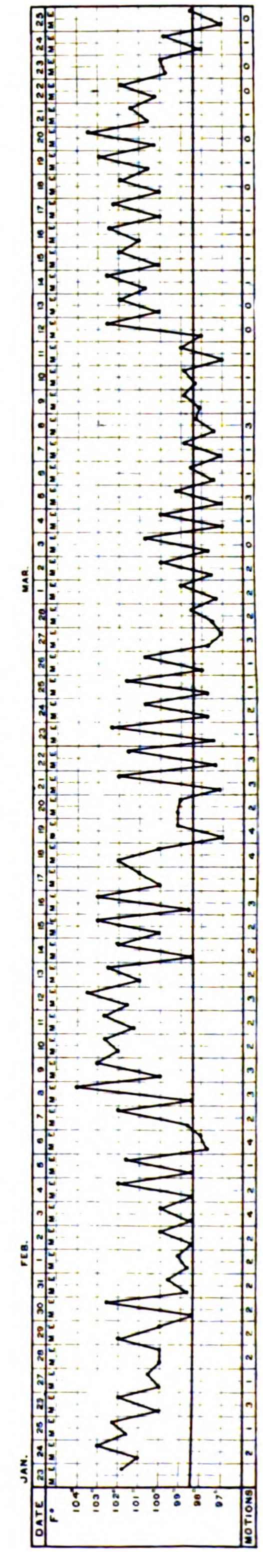
Not tested for paratyphoid.

In due course his fæces and urine were examined, and the *B.paratyphosus* A was recovered from his fæces on several successive days in September, eight months after the fever. Serum reaction on September 12th:—

Dilution of serum:	1—20	1—40	1—100
Stock *B. typhosus* ..	+	±	Trace.
„ *B. paratyphosus* A	+	±	∓
Own strain	+	+	+

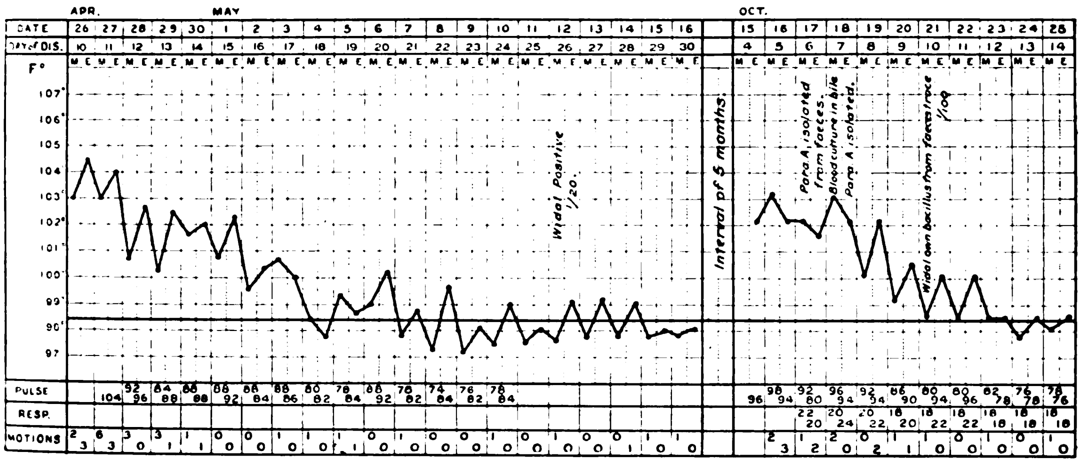
It will be noted that this man's serum agglutinates the stock paratyphosus A in higher dilutions than did the serum of the more recent cases. On examination, a tender spot was found in the gall-bladder region, and he stated that he had never felt fit since the fever, and complained of morning headaches.

I believe that this man is a chronic carrier of the *B. paratyphosus* A. The bacillus isolated is still *sub judice,* as although it resembles *B. paratyphosus* A in morphology and cultural reactions, it differs somewhat from the other strains in its agglutination reactions, being readily agglutinated by normal serum; it may possibly have acquired this property during its long residence in the man's gall-bladder. He has, however, been sent home for further investigation.



Case 10.

I have further investigated this bacillus and have found that 2 cc. of a forty-eight hours peptone-water culture, when injected subcutaneously into a guinea-pig does not kill it, but does produce agglutinins in its serum for the stock paratyphosus A and other local strains. Absorption by W.'s bacillus removes all the agglutinins for the stock paratyphosus A from a serum specific for the latter bacillus.



Case 11.

Case 11.—Serjeant B. R., 1st Rifle Brigade (not inoculated). This serjeant was admitted to the Station Hospital, Chaubuttia, on April 26th, 1909, with fever and headache; the pulse rate was 104. A blood-film was examined for malaria with negative results. His serum diluted 1—20 gave a positive reaction with *B. typhosus*; it was not tested with paratyphosus A. He arrived at Naini Tal Depôt as an enteric convalescent on July 21st; his serum then gave a Widal reaction as follows:—

Dilution of serum:	1—20	1—40	1—100
Stock *B. typhosus*	Trace	–	–

Unfortunately, it was not tested with paratyphosus A.

On October 15th he was admitted to hospital in the depôt with fever and headache; he had a pulse rate of 104; his tongue was clean, but dry in the centre; he had some diarrhœa. Two blood-films were taken and examined for malaria with negative results.

On October 18th, as his temperature continued steadily above

102° F., 8 cc. of blood were taken from the arm and placed in bile. His serum reaction on this day was :—

	Dilution of serum : 1—20	1—40	1—100
Stock *B. typhosus*	±	∓	Trace.
,, *B. paratyphosus* A*	±	±	

* Agglutination first showed in these tubes.

Three typical "pea-soup" stools were passed on this day, and one or two spots were noted on the abdomen; his tongue was clean, dry in the centre, and moist and red at the tip and edges; the headache had gone, and he said he did not feel ill.

On October 19th his condition was much the same; he had a crop of typical rose spots on the abdomen, and the diarrhœa was less.

On October 20th the *B. paratyphosus* A was isolated in pure culture from the bile medium and also recovered from the fæces.

Next day his serum reaction was as follows :—

	Dilution of serum : 1—20	1—40	1—100
Stock *B. typhosus*	+	+	±
Own strain, from fæces	Trace	Trace	–
,, from blood	±	±	Trace.
Stock *B. paratyphosus* A	±	∓	Trace.

His temperature was normal on the ninth day of the disease. The patient, an intelligent non-commissioned officer, stated that he was perfectly well on Tuesday, October 12th, but on Wednesday he had a distinct chill, followed by headache and fever. As he had had malaria at the same time the previous year, he thought that he had got an attack of ordinary fever, but as it did not pass off he came to hospital on the third day of disease. Two films of blood were examined for the first three days with negative results as regards malaria, and he was not given any quinine.

I am of opinion that the attack of fever in Chaubuttia was also due to an infection with the *B. paratyphosus* A, although there is no bacteriological evidence to support this contention, but the low Widal reaction for typhoid which his serum gave on arrival at the depôt shows that the fever was not a true typhoid infection, although the diagnosis of enteric fever was a correct one. If the two charts are compared they will show many points in common as regards the fever pulse rate and condition of the bowels.

I also think that the second attack was due to an auto-infection; unfortunately, owing to the large number of men in the depôt, his excreta had not been examined prior to his second attack, so it is impossible to say where the focus was. He had a large number of

false teeth on a plate and it is just possible that this may have afforded a nidus for the bacilli.

Another possibility is that he may have been infected by Case 10, who was in the depôt at the same time as Serjeant B. R., but no connection whatever could be traced between these men. Serjeant B. R. lived in a bunk by himself and had all his meals in the serjeants' mess, whereas Private W. lived in a separate barrack room, where he had his meals; he also used a separate latrine.

The supposition that Serjeant B. R.'s first attack of fever in May, 1909, was due to an infection with the *B. paratyphosus* A is strengthened by the fact that Private S. of the same regiment was admitted to the Station Hospital, Chaubuttia, on June 1, and on arrival at the depôt here in August his serum gave the specific agglutination reaction for paratyphosus A.

This question of auto-infection and a second attack of fever in the same individual after an interval of nearly six months is a most interesting one, and it is much to be regretted that the first attack of fever in this case was not differentiated by bacteriological methods. As a rule, all cases which on arrival at the depôt give a low, or negative, Widal reaction to typhoid, are retested against the paratyphoids, but most unfortunately this was not done in this case.

On November 2nd his serum reaction was as follows:—

(Untreated) Dilution of serum:	1—20	1—40	1—100
Stock *B. typhosus*	+	±	±
,, *B. paratyphosus* A	±	Trace	–
Stain from his fæces	Trace	–	
,, ,, blood	Trace	–	

Serjeant B. R.'s serum, after absorption for two hours with *B. paratyphosus* A, gave the following result:—

Dilution of serum:	1—20	1—40
Stock *B. typhosus*	Trace	–

General Remarks.

These cases, with the exception of Case 10, were all indistinguishable from mild cases of enteric fever caused by *B. typhosus*, and although the fever in Case 4 lasted twenty-seven days and his temperature remained steadily above 102° F. for twelve days, yet at no time did his condition give rise to any anxiety, nor did he at any time approach the "typhoid state." It may be said, however, that all the patients gave one the idea that they were suffering from an acute inflammatory process rather than from a septicæmia or toxæmia; clear mental condition was a feature in all. In five

of the cases rose spots were noted, and in two cases there was a regular "typhoid rash"; tympanites was present in three cases in which the infecting bacillus was recovered from the fæces; but it did not go beyond a certain fulness of the abdomen. Diarrhœa was noted in three cases, and "pea-soup stools" in two; a "pea-soup" stool, so far as my experience goes, is a somewhat rare symptom of enteric fever in India, the product of a glycerine enema being, as a rule, the typical enteric stool.

Epistaxis was noted in one case, and severe frontal headache was the rule in the early stages of the fever in all cases; it was accompanied in one case by pain in the back of the neck, and in another by pain in the lumbar region. The pulse rate as a rule was more rapid than in uncomplicated enteric fever.

The Widal reactions are of interest, as although all gave a "positive" reaction to *B. paratyphosus* A, yet all with one exception agglutinated the *B. typhosus* in higher dilutions than they did the *B. paratyphosus* A. This may have been due in part to the fact that the strain of *B. typhosus* used is one peculiarly susceptible to agglutination, whereas the strain of paratyphoid used is not so. Roughly it may be said that if the blood serum of a case of fever agglutinates the *B. typhosus* rapidly and in high dilutions, even if it also agglutinates the *B. paratyphosus* A, the case is due to infection with *B. typhosus*. But when the blood serum agglutinates the *B. typhosus* in low dilutions, and *B. paratyphosus* A in the same, or even in lower dilutions, if the agglutination for the latter appears first, then the infection is due to the *B. paratyphosus*.

If a sample of serum agglutinates the *B. paratyphosus* A in high dilutions, and the *B. typhosus* only in low dilutions, then the case is certainly one of infection by the *B. paratyphosus* A.

It might be suggested that these cases were examples of double infection, but careful cultural examinations of the blood, urine and fæces failed to yield any evidence of the *B. typhosus*, and also absorption experiments showed the agglutinins to be specific for *B. paratyphosus* A.

It will be noted that the cases from the camp were admitted at intervals of about one month from one another, and it might be argued that these men were infected from each other in the early stage of the fever before admission to hospital. Yet the excreta of all cases were examined on admission and found to be infective in only one instance, Case 9; this case was the last from the camp, and no further cases occurred up to three months later. Another explanation of the spacing of these cases would be to accept

Conradi's theory that enteric fever cases are most infective during the incubation period, a theory the truth of which must be exceedingly difficult to prove or disprove.

The question of the origin of these cases has been investigated by the Divisional Sanitary Officer, Major J. C. Weir, R.A.M.C., and will form the subject of a special report.

The question of the differentiation of cases of enteric fever may appear to have only an academic importance; but it has also a practical significance, in view of the statistics for anti-enteric inoculation, as this prophylaxis cannot be expected to protect against paratyphoid infection. It would appear also that paratyphoid infection is becoming more common in India.

The only certain method by which cases of infection by paratyphoid bacilli can be differentiated from cases due to infection by the *B. typhosus* is by careful cultural examinations of the blood and excreta. It might not be out of place here to point out one or two fallacies which may crop up in the bile-blood culture method.

To begin with, bile when drawn from a slaughtered animal is rarely sterile, and owing to its consistence is exceedingly difficult to sterilise except in an autoclave. The bacilli present in bile, all, or nearly all, belong to the colon group, and may resemble typhoid or paratyphoid bacilli very closely in their cultural and morphological characteristics. At the same time it is impossible to tell by simply looking at bile whether it is sterile, and even incubation may fail to reveal any contamination, the few bacilli present being inhibited by the glycerine in the medium, but the addition of 5 or 6 ccm. of fresh sterile blood will revive these and enable them to multiply, and an apparently pure culture of some typhoid-like bacillus is then recovered from the bile culture. As all such bacilli are intestinal organisms they are agglutinated in greater or lesser degree by normal human serum, and similar bacteria may coincidently be present in the fæces (see Case 1 of this series).

Description of the Strains of Bacilli isolated.—All the strains of bacilli isolated were identical, with the exception noted in Case 10. These bacilli were agglutinated at once macroscopically by high titre serum specific for *B. paratyphosus* A, but were not so agglutinated by sera specific for *B. typhosus*, or *B. paratyphosus* B. In sedimentation tubes after twenty-four hours, a typhoid serum which in a dilution of 1—5,000 agglutinated the *B. typhosus* completely, only agglutinated the paratyphoid bacilli incompletely in a dilution of 1—80, and a serum which agglutinated the stock

B. paratyhosus A in a dilution of 1—2,000 agglutinated these bacilli in the same degree.

The serum of a guinea-pig was tested and found not to agglutinate the stock *B. paratyphosus* A. It was given a dose of 1 ccm. of a sterilised culture of the blood strain from Case 11; four days later its serum agglutinated the stock paratyphoid A incompletely in a dilution of 1—20; a week later the serum agglutinated the stock culture completely in a dilution of 1—20, and gave a marked reaction in a dilution of 1—40.

Morphologically they were small bacilli, shorter and stouter than *B. typhosus*, but filamentous forms were common in broth and in the water of condensation of agar tubes. All the strains were *more* motile than the stock typhoid. They did not stain by Gram's method. All strains were not tested for virulence, but those that were showed a high degree of virulence for guinea-pigs, a dose of 1 cc. of a twenty-four hours broth culture intraperitonially being fatal in one day.

Sugar Reactions.—Two sets of sugars were used, one the ordinary litmus nutrose water medium with 2 per cent. of lactose, glucose, maltose, cane sugar, mannite, and dulcite; the other a 2 per cent. neutralised agar in peptone water with the same sugars in solution; the latter were used as "shake" cultures.

All the strains isolated produced acid and gas in glucose; this was best shown in the neutral red broth agar tube; as a rule only a few small bubbles of gas were produced, but occasionally the agar was split across but never separated, and a slight greenish tint appeared at the margin, contrasting well with a control typhoid tube in which no change occurred, and a paratyphoid B tube in which the portions of agar were well separated with a broad margin of fluorescence. In the nutrose water sugar tubes these bacilli coagulated the nutrose in the glucose and mannite tubes, but in the other sugars, maltose, lactose and saccharose, the results were identical with that produced by *B. typhosus*. The results given by some of the strains in neutral red agar shake cultures are given in tabular form.

None of the strains coagulated litmus milk, but by means of this medium they could be separated from *B. typhosus*, as they produced more acidity and did not show the later alkalinity of *B. paratyphosus* B. The colonies on Conradi plates (old medium) could not be distinguished from typhoid colonies, and they grew as well as *B. typhosus* on Conradi's new green medium.

No indol was produced, and gelatine was not liquefied.

In conclusion, I have to thank Lieutenant-Colonel J. M. F. Shine, R.A.M.C., Officer Commanding Station Hospital, Naini Tal, for permission to use the notes, &c., of the cases under his charge; Lieutenant-Colonel Close, I.M.S., Civil Surgeon of Naini Tal, for the notes of Cases 2 and 6, and Captain E. L. Moss, R.A.M.C., for the notes of Case 11.

All the blood cultures, Widal reactions, examinations of fæces and urine, and investigations of the strains of bacilli isolated were carried out in the laboratory of the enteric fever convalescent depôt, except where otherwise noted, and were controlled by negative findings in cases of fever, due to liver abscess, pneumonia, &c.

NOTE.—The symbols used to denote the agglutination tubes signify as follows:—

$+$ Complete agglutination.
$\pm$ Incomplete agglutination: more bacilli clumped than remain unclumped.
$\mp$ Incomplete: more bacilli unclumped than there are clumped.

TABLE OF REACTIONS IN NEUTRAL RED AGAR SHAKE CULTURES.

	Hours	Glucose	Maltose	Cane sugar	Mannite	Lactose
Stock *B. typhosus*	24	*Nil*	*Nil*	*Nil*	*Nil*	*Nil*
	48	,,	,,	,,	,,	,,
	72	,,	,,	,,	,,	,,
	96	,,	,,	,,	,,	,,
	120	,,	,,	,,	,,	,,
Stock *B. paratyphosus* A	24	G.	,,	,,	G.	,,
	48	G.	G.	,,	G.	,,
	72	G.	G. + Fl.	,,	G. + Fl.	,,
	96	G.	G. + Fl.	,,	G. + Fl.	,,
	120	G. + Fl.	G. + Fl.	,,	G. + Fl.	,,
Stock *B. paratyphosus* B	24	G. Sp.	*Nil*	,,	G. Spl.	,,
	48	G. + Fl.	G.	,,	G. + Fl.	,,
	72	G. + Fl.	G.	,,	G. + Fl.	,,
	96	G. + Fl.	G. + Fl.	,,	G. + Fl.	,,
	120	G. + Fl.	G. + Fl.	,,	G. + Fl.	,,
Case No. 11. Fæces strain	24	G.	*Nil*	,,	G.	,,
	48	G.	,,	,,	G.	,,
	72	G. + Fl.	G.	,,	G. Spl.	,,
	96	G. + Fl.	G. + Fl.	,,	G. + Fl.	,,
	120	G. + Fl.	G.	,,	G. + Fl.	,,
Case No. 11. Blood strain	24	G.	*Nil*	,,	G.	,,
	48	G.	,,	,,	G.	,,
	72	G.	G.	,,	G.	,,
	96	G.	G. + Fl.	,,	G. + Fl.	,,
	120	G.	G.	,,	G. + Fl.	,,
Case No. 10. Fæces strain	24	G.	*Nil*	,,	G.	,,
	48	G.	G.	,,	G.	,,
	72	G.	G.	,,	G. + Fl.	,,
	96	G.	G. + Fl.	,,	G. + Fl.	,,
	120	G.	G.	,,	G. + Fl.	,,

TABLE OF REACTIONS—*continued.*

	Hours	Glucose	Maltose	Cane Sugar	Mannite	Lactose
Case No. 7. Blood strain	24	G. ..	*Nil* ..	*Nil* ..	G. ..	*Nil*
	48	G. ..	G. ..	,, ..	G. Spl. Fl.	,,
	72	G. + Fl. ..	G. ..	,, ..	G. + Fl. ..	,,
	96	G. + Fl. ..	G. + Fl. ..	,, ..	G. + Fl. ..	,,
	120	G. + Fl. ..	G. + Fl. ..	,, ..	G. ..	,,
Case No. 8. Blood strain	24	G. ..	*Nil* ..	,, ..	G. ..	,,
	48	G. ..	G. ..	,, ..	G. ..	,,
	72	G. ..	G. ..	,, ..	G. ..	,,
	96	G. ..	G. + Fl. ..	,, ..	G. ..	,,
	120	G. ..	G. + Fl. ..	,, ..	G. ..	,,
B. coli	24	G. Spl. Fl.	G. Spl. Fl.	G. trace and Fl.	G. Spl. Fl.	G.+Fl.
	48	G. Spl. Fl.	G. Spl. Fl.	,, ,,	G. Spl. Fl.	G.+Fl.
	72	G. Spl. Fl.	G. Spl. Fl.	,, ,,	G. Spl. Fl.	G.+Fl.
	96	G. Spl. Fl.	G. Spl. Fl.	,, ,,	G. Spl. Fl.	G.+Fl.
	120	G. Spl. Fl.	G. Spl. Fl.	,, ,,	G. Spl. Fl.	G.+Fl.
Bile contamination*	24	G. Spl. ..	*Nil* ..	*Nil* ..	G. ..	*Nil*
	48	G. + Fl. ..	G. + Fl. ..	,, ..	G. + Fl. ..	,,
	72	G. + Fl. ..	G. + Fl. ..	,, ..	G. + Fl. ..	,,
	96	G. + Fl. ..	G. + Fl. ..	,, ..	G. + Fl. ..	,,
	120		G. + Fl. ..	,, ..	G. + Fl. ..	,,

* Did not agglutinate in any of the specific sera. In amount of gas and degree of fluorescence resembles *B. paratyphosus* β very closely.

NOTE.—All these cultures were put up on the same day and in the same batch of medium.

G. = gas. Fl. = fluorescence. Spl. = agar split across, all the cane sugar and lactose tubes, including the typhoid ones, showed loss of colour.

Editorial.

TYPHOID CARRIERS.

In the February number of the Journal, 1909, an outbreak of typhoid fever in Badajoz Barracks, Aldershot, caused by a carrier of the *Bacillus typhosus* was reported by Major Cochrane; and in the present number an interesting outbreak at Kilworth Camp, Ireland, is described by Captain Dorgan, who attributes the infection to the presence of a female carrier employed on the farm supplying milk to the units affected.

The importance of typhoid carriers in relation to outbreaks of typhoid fever, both in civil and military life, has been much debated. As regards civil life, Klinger's careful studies in Germany led him to believe that the carrier played a comparatively small part as compared with the typhoid patient. In his report on the anti-typhoid campaign in the south-west of the German Empire he states: "The typhoid patient was the source of infection in 1,272 cases, and the healthy typhoid carrier in 125 cases. Typhoid patients may therefore be considered the chief source. This is due to their being not only more numerous than the carriers, but also to the fact that the germs passed by them have usually a higher pathogenicity. The possibility that unexplained cases may be due to chronic carriers cannot be negatived at once. Further, every infection by a carrier may be the first in a long series of cases; in fact, one carrier may be responsible for a whole epidemic. The importance of the carrier must not, therefore, be underestimated. He is an important factor, and typhoid houses and typhoid areas seem to be his work."

Aldridge, from a study of typhoid fever cases occurring amongst the British troops in India, also came to the conclusion that the typhoid patient is a much more important source of infection than the typhoid carrier. He points out how infection may be spread by the soldier in the early days of the attack before reporting sick. In this connection it is interesting to note that out of 812 infected people, Klinger found 33 were infected by patients in the first week of incubation, 150 by patients in the second week of incubation, and 187 by patients in the first week of illness.

There seems, therefore, to be a growing opinion that the

influence of typhoid carriers in the causation of typhoid fever has been overrated; and that if care be taken to exclude them from employment in the preparation of food and drink, infection is not likely to be caused by the presence of a few carriers amongst the community, especially if a water-carriage system of sewage disposal be in vogue.

The seasonal prevalence of typhoid fever is difficult to explain on the typhoid carrier hypothesis.

It has been suggested that: (1) There might be a marked seasonal excretion of bacilli. Outbreaks of typhoid fever have commonly occurred during the summer months, but up to the present it has not been shown that excretion of bacilli by carriers is specially active during these months. There is little doubt that in some cases the excretion of bacilli is intermittent, while in others it is practically continuous. This is well shown by the work on carriers carried out for the Advisory Board and reported in this number. The investigation has also demonstrated a marked variation in the number of bacilli excreted by those who do so continuously, a variation which is not to be explained by changes in the consistence of fæcal material, it being just as marked in urine. The variation in the number of bacilli, moreover, appears to occur indifferently throughout the year and will not explain the marked rise in the number of cases of typhoid fever, which takes place at definite seasons both at home and abroad. (2) The virulence of *B. typhosus* excreted by carriers might vary, being greater during the usual seasonal prevalence than at other times of the year. Ludke believes that the persistence of bacteria in the human organism is related to a diminution of virulence, and Hilgerman also states that the bacilli in the organs of carriers diminish in virulence. E. Müller has tested the virulence of thirteen strains of typhoid bacilli living in carriers for periods of one to four and a half years. He injected $\frac{1}{5}$ to $\frac{1}{10}$ of a standard loopful of a twenty-four hours agar culture of each strain into the peritoneal cavity of a guinea-pig weighing 300 grammes and found that all the animals remained well; a similar amount of culture isolated from the spleen of a case of typhoid fever caused death. We have found that $\frac{1}{10}$ of a twenty-four hour culture on agar of a strain isolated from a chronic carrier proved fatal to a full-grown guinea-pig. There may be a variation in the virulence of the typhoid bacilli excreted by carriers, as there are facts which show that at times the bacilli become dangerous to the carrier himself. On *post-mortem* examination of chronic carriers, Levy and Kayser found a general infection

by the *B. typhosus*, which had caused death. In these cases the possibility of a fresh infection from other sources could be excluded, consequently it would appear that the *B. typhosus* might maintain its virulence, possibly varying in degree in certain seasons, for some years in the tissues of the carriers. (3) Seasonal conditions might affect the resisting powers of the body and predispose to infection. Rosenau, Lumsden, and Kastle state that the striking seasonal prevalence of typhoid fever observed in Washington and many other epidemic foci may be explained by the infective organisms absorbed during the winter months from various sources, being incapable of causing disease in the majority of cases at that time of the year. Being, however, stored in the bodies of these persons, with the advent of warm weather other factors become operative and disease results.

Whatever may be the explanation of the seasonal prevalence of typhoid fever, there is now strong evidence that in many outbreaks the link between the various seasons is formed by the bacilli carried in the human body.

In the *Zeitschrift für Hygiene*, 1909, there is an instructive account of typhoid fever endemic in regiments of field artillery stationed at Wesel from 1905 to 1907. Cases of typhoid fever occurred at irregular intervals; sometimes in groups of two or three, sometimes singly. The general sanitary condition of the barracks was good. Epidemiological evidence pointed to the canteen as the most probable source of infection; repeated bacteriological examinations were made of the stools and urine of the *personnel* of the canteen, but with negative results. Examinations of all officers and men who had suffered from typhoid fever during their service at the station also proved negative. Early in 1908 a systematic examination was made of the stools and urine of all persons in the garrison, and a Serjeant B. was found to be excreting an almost pure culture of typhoid bacilli in his urine. No other carriers were detected. Serjeant B. was at once isolated, and no further cases occurred during 1908. The epidemiological details seem to prove that *one* bacillus-carrier was responsible for the unusual prevalence of typhoid fever in a garrison where sanitary conditions were above the average.

The importance of typhoid carriers is recognised in America, and in the report of the Surgeon-General, United States Army, issued in 1909, it is stated that the following instructions have been issued to post surgeons through Chief Surgeons of the departments: "Hereafter no case convalescing from typhoid fever will be returned

to duty until three negative reports on samples of urine and fæces, collected at six-day intervals, have been made. Any typhoid patient who is not suffering from a relapse, and who continues to excrete typhoid bacilli after ten weeks from the beginning of his fever, should be reported to the Chief Surgeon of the department."

An interesting epidemic of typhoid fever in the 15th Division of the Japanese Army has also just been reported in the *Archiv. für Schiffs-und-Tropen Hygiene* for March, 1910. Cases of typhoid fever occurred during the years 1906, 1907, and 1908, and were practically limited to the Division in question, their being few cases in the neighbourhood. Changes of station had no effect in limiting the epidemic. An examination of the men was then made and eleven carriers were detected and promptly isolated, when the disease disappeared. It is especially interesting to note that carriers who were found to excrete typhoid bacilli for a period of six months were removed from active service with the troops.

It is evident, therefore, that in military life we cannot afford to ignore the carrier, as owing to the life in common of the men opportunities of contact infection are so many and various. On active service these opportunities are even greater, and as all our efforts to cure the carriers have so far failed, the decision to invalid carriers, who refuse further hospital treatment, is undoubtedly wise.

In most of the outbreaks clinically resembling typhoid fever the *B. typhosus* has been found, but in a certain number of cases paratyphoid bacilli have been isolated. In 1906, when investigating 64 cases in Tunis, clinically like typhoid fever, Nicolle and Cathvive found 16 were caused by the *B. paratyphosus* A. In Ceylon, Castellani also isolated the same bacillus from 5 cases, and Captain Harvey reports in this number of the Journal an interesting series of cases caused by the paratyphoid A bacillus. Klinger, in 1906 and 1907, found 307 cases due to paratyphoid bacilli; of these, only 3 were caused by the paratyphoid A bacillus; from all remaining cases paratyphoid B was isolated. Paratyphoid fever has the same curve as typhoid fever, and it has much the same epidemiological features, except that chronic cases are not so common. Cases due to personal contact have been more or less proved and carriers also appear to play a part.

United Services Medical Society.

STAFF RIDES.

BY MAJOR F. J. WADE-BROWN.
Royal Army Medical Corps.

THE Staff Ride season being at hand, I was asked a few weeks ago if I would, whilst in London, read a paper on Staff Rides at the February meeting of the United Services Medical Society for the benefit of those officers who as yet had not had the opportunity of attending such trainings, and who wished to know what was expected of them when they did. I afterwards saw it announced in the Journal that I was to read a paper on *Medical* Staff Rides. This was a mistake, and I might say at once I know little or nothing about *Medical* Staff Rides; my whole time has been taken up with the ordinary Brigade, Divisional and Staff College Rides, and with manœuvres. No doubt there are some officers present who have participated in Medical Staff Rides, and it will be very interesting to hear what they have to say about them, and whether they are in favour of them or not.

Lectures, according to Section 33, Training and Manœuvre Regulations, are of two varieties—those on special subjects of military interest, and those intended mainly to provoke discussion.

As there are two classes of officers present this evening—those who have not attended Staff Rides and those who have—I trust my paper will be of some special interest to the former, as it is intended chiefly for them, and that the latter will find in it certain points for discussion.

There are many ways of learning field organisation and administration — viz., from books and lectures, from war games, from manœuvres, from Staff Rides, and from Regimental Tours.

A great deal can no doubt be learnt from books, lectures, and war games, but such knowledge is very soon forgotten; practical knowledge is everything. What would be the good of anatomy or pathology learnt only from books? Where would the surgeon be when brought face to face with some difficult abdominal operation, without the experience gained in the dissecting room? or the pathologist, dealing with some obscure case, without the practical experience derived from the *post-mortem* room and the laboratory? In like manner, how handicapped a medical officer would feel

if suddenly ordered to assume some administrative command in the field without having had practical experience in staff work during times of peace.

Of course, the best training is to be obtained on active service, but that is not where an officer goes for his training; it is there he puts into action the knowledge he has previously acquired elsewhere, and wars cannot be had to order. The best means at our disposal are Staff Rides and manœuvres, and these exercises are the means whereby officers of all branches of the Service make themselves proficient in strategy, tactics, and administration—in short, the "art of war."

Strategy is the science of leading armies, the art of conducting military operations in the field leading up to the actual conflict. Tactics, the branch of military science which relates to the conduct of troops in battle, the handling of troops in action. Administration consists in the performance of duties other than actual fighting, and deals chiefly with corps and departments that help to maintain the fighting troops in a state of efficiency.

Staff Rides differ from manœuvres in that they are performed without the actual presence of troops and impedimenta; all these are imaginary. Consequently, in my opinion and experience, Staff Rides are more difficult to perform, for it is certainly harder to imagine than to see.

It is mainly since the late South African War that much attention has been given to peace training, especially in the direction of Staff Rides, the importance of which is increasing rapidly.

At first when Staff Rides, or Tours as they are sometimes called, were held no medical officer attended, but since it has been realised what an important part the Medical Service plays during operations in the field, and how *so* much depends upon medical administration and efficiency, increased facilities have been afforded medical officers to make themselves acquainted with the intricate workings of their own and other organisations, with advantage no doubt to combatant and other officers.

Staff Rides are field exercises for Staff Officers and officers who command or who are likely to command, not for junior officers, who should attend Regimental Tours. It must further be clearly understood that these Rides cost a great deal of money and the expense is borne by the training grant; therefore only Staff Officers, Commanding Officers, Staff Officers doing duty with garrison units, and officers who will shortly command or who will hold some important administrative appointment, should be allowed to benefit by this sort of training.

Regimental Tours are Staff Rides on a small scale, generally commenced and ended the same day. A tactical problem, or a series of problems, is worked out on the ground, the work being afterwards corrected by the Director (a Field Officer) at a conference held in the evening. These exercises are particularly useful for training junior regimental and departmental officers and, what is more, cost practically nothing.

It is stated that when Staff Rides were first instituted officers from the Staff College did a lot of outdoor work which was afterwards corrected at the Staff College, and the results were made known some weeks after the Ride had taken place, and officers had lost all interest in their previous doings.

Then followed Staff Rides with Senior Staff Officers as Directors and Assistant Directors on the spot correcting the work as it came in. This plan was of course a great improvement, and has been followed since.

I well remember the first Staff Ride I attended some years ago; there was no one to correct my work, so it was forwarded to the Principal Medical Officer of the Command, from whom I received it some months afterwards; but that would not happen nowadays—times have altered, and Directors know much more about our work than they did then, and often have a medical officer with them on the Directing Staff to assist in solving medical problems.

In describing a Staff Ride the following are the chief points I wish to deal with, and I would request officers who are likely to go Staff touring in the near future to give each one the greatest consideration and thought.

(1) Varieties of Staff Rides, single and double.

(2) Officers attending.

(3) The scheme.

(4) An appreciation.

(5) Course of a Staff Ride: preliminary considerations, narrative, evening work, conference, and reconnaissance.

(6) Director-in-Chief's conference.

(1) *Varieties of Staff Rides.*—Staff Rides may be "single" or "double."

In the former variety one side is represented by a body of officers; the enemy is imaginary, his doings being regulated either by the Director or a special officer detailed for the purpose. In a double Staff Ride the opposing forces would be represented by officers on both sides.

It will easily be understood that certain Staff Rides must of necessity be single; so much depends upon the number of officers available and the means of telegraphic and telephonic communication in the part of the country in which the Ride is to take place.

Brigade Staff Rides are usually single; whilst Divisional and District Rides are more often double, as there are many Staff Officers in a Division, the list being headed by a Major-General and four Brigadier-Generals.

(2) *Officers Attending.*—The most important officer is known as the Director-in-Chief; he is, one might say, the chief umpire or referee, he is responsible for the preparation of the scheme, he gives decisions for the preparation of the narrative, and conducts the final conference.

On large Staff Rides for each side there is a Director and also an Assistant Director, but on ordinary divisional double Staff Rides the most senior officer, styled the Director, takes the place of Director-in-Chief, an Assistant-Director being of course appointed to each side. Sometimes, when sufficient Brigadiers or Senior Staff Officers are not available, the Director acts as the Assistant Director of one side in addition to his duties as Director-in-Chief.

The Assistant-Director is the hardest worked officer of all; he communicates by telegraph or telephone the Commander's orders to the Director, receives the Director's orders for drawing up the narratives, criticises the work done by officers of his side (except the Commander's work, this is forwarded to the Director), ascertains what tasks the Commander has set the officers for reconnaissance during the day, visits the officers whilst at work, orders the indoor evening work for each officer, and after dinner presides at the evening conference.

One other officer deserves a passing mention: he is the Junior Staff Officer, who is a sort of A.D.C. and Secretary to the Director or Assistant Director. His duties are numerous, some of them being—to make all arrangements at the hotels, to arrange for rooms, and tariffs, &c., to accompany the Director, to keep the Director's map corrected up to date, to write out narratives according to Director's or Assistant Director's instructions, to keep a notebook in which he enters the Director's or Assistant Director's criticisms on officers' work, and a second book containing a record of officers' tasks, to collect officers' work when completed (reports, &c.), to hand corrected work to officers before the evening conference, and to collect it again after the conference, and, finally, to settle hotel bills

and look after baggage on the last day when the final conference is taking place.

To return to the number of officers attending. Should the Staff Ride be a "Single" one, a Brigade one probably, the Director would be the Brigadier-General and his Staff Officer the Brigade-Major. No Assistant Director would be required, the Director himself, or an officer detailed for that purpose alone, as before mentioned, conducting the enemy's operations. The Director would correct the work sent in, issue the narratives, and hold the evening conference.

The next officer of importance is the "Officer commanding the Force," who is generally an officer commanding one of the battalions of the Brigade; he is accompanied by a Staff Officer.

The other officers are the "Officer Commanding the Infantry Brigade," who is also an officer commanding one of the battalions; the Officer commanding Cavalry, a Cavalry or Mounted Infantry officer; the Officer Commanding Artillery, a Battery Commander; a Medical Officer; and a Supply Officer; and sometimes an officer of the Royal Engineers.

Should the Staff Ride be a "Double" one, the Director would be the Major-General Commanding the Division, with one of his own Staff, a Colonel probably, as Staff Officer. There would also be two Assistant Directors, Brigadiers, one for each Army, but sometimes, as before stated, the Director fulfils the duties of Assistant Director on one side. A Brigadier-General would command the Red Force and another the Blue, with their Brigade-Majors as Staff Officers. Brigadier-Generals (or Senior Commanding Officers) would command the Division or the Infantry with their Brigade-Majors as Staff Officers. There would also be an Officer Commanding Artillery, Officer Commanding Cavalry, Medical Officer, Supply Officer, and sometimes a Royal Engineer Officer.

No hard-and-fast rules can be laid down for the composition of a Staff Ride, it all depends upon circumstances. There are many varieties besides the two just mentioned, the largest of all being where there is a Director-in-Chief, a Lieutenant-General, and two Directors, also probably Lieutenant-Generals, two Major-Generals commanding the Forces, and Brigadier-Generals commanding the Divisions, Cavalry, &c.

Some two or three weeks before the Ride commences each officer will receive his orders, the scheme, and some maps, with an intimation that an appreciation has to be forwarded to the head-quarter office by a certain date, generally three or four days before the officers assemble.

I will now explain what is meant by a "scheme" and an "appreciation."

(3) *The Scheme.*—A scheme is the problem that is to be worked out during the Staff Ride; it is printed on red paper for the Red Force, and on blue for the Blue. The scheme may be purely imaginary or based upon some previous campaign in history. As an example of the latter variety I might mention a Staff Ride in which I had the pleasure of taking part in June, 1908, and which was carried out by the Commandant and the officers of the Senior Class at the Staff College, Camberley.

On this occasion the theatre of operations, along the valley of the River Severn, was intended to represent that of the 1859 Campaign in the valley of the River Po, between Austria on the one side and France allied with Lombardy on the other. The Severn between Bristol and Bridgenorth resembles the River Po between Pavia and Turin, and the other English rivers and canals also bear a great resemblance geographically to those of Italy. A comparison of the distances between the English places named in the scheme shows that they are nearly the same as the distances between the corresponding Italian towns. A short description of this Ride appeared in the JOURNAL OF THE ROYAL ARMY MEDICAL CORPS, September, 1908, but I am using it this evening, as it is so instructive, concise, and accurate, to illustrate certain points in this paper.

It will be seen from the papers I have handed round that a "scheme" is divided into two parts, called the "general idea" and the "special idea."

The "general idea" is the same for both sides, it is a public document, at least contains nothing confidential; it is, however, a most important document, and, as the Training and Manœuvre Regulations state, includes all the data which can affect the solution of the particular problem.

In addition to describing the seat of war it tells the reason for hostilities, the general political situation, characteristics of the opposing armies, the moral of the troops, the attitude of the inhabitants in the area of operations, the security or otherwise of the lines of communication, the value of the capital both politically and in respect of the military resources of the country, and so on. Of course, all these points are not fully gone into in every scheme, but only those that affect the particular situation.

The "special idea," on the other hand, is a strictly confidential document; it differs for each side, and, to again quote the Training

and Manœuvre Regulations, contains the *immediate* problem to be solved and gives the information of the adversary's position and movements, which each commander might in war be assumed to possess.

These general and special ideas are not made up in a few hours, but are worked out by staff officers, and sometimes take days to complete, and when completed they are severely criticised by other staff officers who realise that the scheme must be complete in every detail: one false statement, one piece of information wrongly inserted, might, and probably would, bring the whole Ride to grief.

As the "scheme" is so very important and must be thoroughly understood, I trust my audience will pardon me if I go into it somewhat at length, and to make it perfectly clear I will therefore read the general idea of one of the London District Staff Rides, and the general and special ideas of the Staff College Ride before mentioned, the latter being illustrated by this map of England and Wales.[1]

Before passing on to describe the "appreciation" I should like to say that a scheme is generally fixed for a certain date, some days probably before the commencement of the actual Staff Ride; say, for instance, the scheme is fixed for to-day, February 9th: officers would have received it from headquarters probably on the 5th or 6th and been told to send in an appreciation by the 15th (presuming the Ride is arranged for the 18th). An interval will be noticed, viz., from the 9th to the 18th. How will this be accounted for? Based on the scheme, the two commanders (Red and Blue Army) will form their plans and write appreciations and, in accordance with these plans, the Director-in-Chief will draw up a narrative, which will be posted up at 5 p.m. on the day the Staff Ride commences, showing the moves that have taken place and the exact position of the troops at that moment. A Staff Ride consists of strategical and tactical work, but if the Ride commenced with strategical work there would be little time for tactical work, as the Ride usually only lasts four days. Tactical work is that which is most sought after, consequently the greater part of the strategical work, especially that appertaining to the cavalry, is worked out on maps and done with before the Ride commences. A well-known Staff Officer writes that at the beginning of a Ride the officers will find from the first narrative that the cavalry patrols are in touch, main body of cavalry is ten miles or so behind, and the main infantry body

[1] The lecturer here read the "ideas" mentioned.—Editor.

perhaps two days behind the cavalry. The great idea seems to be to start with the infantry bodies fairly close to each other, so that tactics will find a place, whereas otherwise they would have to give way to strategy, which, as before stated, is not what is wanted.

(4) *The "Appreciation."*—An appreciation is an essay containing a number of facts and theories, a statement of what is known and what is surmised, what exists and what may exist, what is happening and what might happen. The regulations before quoted state that an "appreciation" is the means an officer possesses of appreciating a situation so as to arrive by a careful consideration of influencing factors, known or supposed, at a conclusion as to the best course to adopt in certain given circumstances; and this teaches an officer to arrange his facts methodically and trains him to arrive rapidly at a logical and sound conclusion. This being the case, a *medical* officer ought certainly to feel "at home" when ordered to write an appreciation, for no man living is more accustomed than he at arriving at logical and sound conclusions or forecasting events, for his very existence breathes of diagnosis and prognosis. Whatever mistakes medical officers make on Staff Rides, few faults can be found with their appreciations. Just twelve months ago at Poona I had over twenty appreciations to criticise; they proved most excellent and instructive reading, and I had very few faults to find, except that one was a little too long, 57 pages of foolscap closely written. One of them, written by Captain Aylen, I have with me this evening, and shall be glad to show it to anyone who would like. to see it at the close of the meeting. The first appreciation should be prepared, *if* ordered, when the scheme and maps are received from Headquarters, the date, as I said before, when it should be sent in would also be mentioned. I say "*if* ordered" because very often the medical officer is forgotten or looked upon only as someone to assist the Director or Assistant Director in criticising medical details in other officers' work, but this is not why medical officers attend Staff Rides, they are there to learn their own work more fully, not merely to prove just what they know. Wherever I have been I have always, if necessary, asked the Director-in-Chief to include medical officers in the list of those officers who have to write appreciations. But whether *wanted* or *not*, an "appreciation" should always be prepared; it makes an officer study the scheme, it makes him take an interest in what is before him, and it makes him work up books and regulations on the subject, so that he feels more at home, more keen, and much more interested on the day of assembly.

The first appreciation should be written most fully, every point considered, not a stone left unturned. The medical officer will see that perhaps there are many courses open to his commander; he should consider each in detail and make his arrangements accordingly, and perhaps end his report by saying: "Until I know the course the commander will take I cannot make more definite arrangements," or words to that effect.

The following are some of the points he might consider in his appreciation, after studying the scheme :—

(1) Strength of forces engaged (*vide* war establishments).

(2) Medical units and all details connected therewith in the collecting zone, evacuating zone, and distributing zone.

This is a large subject, the line of communication arrangements being of much importance and often of great magnitude.

(3) Sanitary measures. Recommendations for the prevention of disease. Details respecting climate, country, local diseases, supplies.

(4) The number of existing hospitals, known or presumed, medical personnel, and medical supplies in the country to be entered.

(5) Voluntary aid societies, and many other points too numerous to mention here.

I have particularly said *first* appreciation, for later on during the Ride other appreciations may be suddenly called for, and these should be short and to the point, the shorter the better, if long the Director or Assistant Director will have no time to read them.

(5) *Course of a Staff Ride.*—Preliminary considerations. As there will be a great deal of time to spare between the receipt of orders and the day of assembly a medical officer might, with advantage, occupy himself in studying the following books: "War Establishments," "The Training and Manœuvre Regulations," "Field Service Pocket Book," "Field Service Regulations," Parts I. and II., "Field Service Manual A.M.S.," and Appendix 35 of that volume, paying particular attention to the composition of divisions and cavalry divisions, infantry brigades, brigades of artillery, batteries, mounted brigades, supply columns, first and second lines of transport, and, if I may be allowed to say so, field ambulances, cavalry field ambulances, clearing hospitals, and line of communication units.

The appreciation having been sent in as directed, the officer begins to get ready for the Ride itself. A notice will have been sent from the Headquarters Office stating where the Ride is to take

place, and all particulars such as trains, hotels, place and hour of rendezvous, whether plain clothes will be worn, if bicycles should be taken, and the probable hour of return. As a rule the Ride takes place at some distance from the garrison, so that new and perhaps unfamiliar ground will be worked upon, and officers being away from their stations and not having their thoughts distracted, will be able to use every part of the day, and a great part of the night too, for the hard work—and real hard work it is.

The officers of the two armies put up at towns some distance apart; and the Director or Director-in-Chief at some intermediate place; for instance, in March, 1908, London District Staff Ride, the officers of the Red Army stayed at Marlborough, those of the Blue Army at Bath, and the Directing Staff at Chippenham.

Before leaving his station the officer should see that everything in the way of writing materials, maps, and books, is packed in a small separate valise and handy for reference at any moment. Ordnance maps will have been received from the Staff Office; these will have to be returned when the Ride is over, and I have found it particularly useful to obtain a good cycle or motor map of the part of the country in which the Ride is to take place. When I first attended Staff Rides some years ago I found it somewhat difficult to follow the movements of the troops engaged, they varied so much from day to day. The medical officer has to know the positions of *all* the troops, not just a division or brigade, and he therefore needs some help to memory. I now overcome this difficulty with the aid of the official maps supplied me, and some pins and paper flags. On arrival at my destination the first thing I do is to secure a table for myself, and then ask the landlord of the hotel for a large packing case lid; to this, by means of drawing pins, I attach the official maps, and as soon as the first narrative is posted up (directly after arrival) I find out the positions of the engaging forces and place pins and flags[1] accordingly, and alter them each time a narrative is published. This may seem a simple matter, and so it is, but I can assure you it is a great assistance, especially if called upon one evening to suddenly appreciate the new situation, and every one is crowding round the one map upon the wall. The flags[1] I am handing round are samples of those I generally use; it will be observed that only one side of each is coloured, the other can be written upon so as to denote smaller bodies of the same

[1] Major Wade-Brown will be glad to send specimens to any officer desiring to see them.—EDITOR.

troops or units, such as a half company, a squadron, a section or sub-division of a field ambulance, and so on.

On arrival at the place of assembly a "narrative," as before stated, will be posted up giving the situation up to that date and hour, but, before going further, I must explain what is meant by a "narrative."

A "narrative," which is usually published each day at 5 p.m. (unless night operations have taken place, in which case it is posted up at 9 in the morning), tells of the probable results of the actions of the two commanders; it is compiled by the Director or Assistant Director, the most senior officer deciding the good and bad moves and orders of each commander, and penalising the one who has accomplished that which could not have been performed on active service, such as the too rapid movement of troops. He decides what actions have been successful and what actions have not, and sometimes to produce a certain desired situation he introduces certain unforeseen events, or perhaps the receipt of unexpected intelligence. The narrative gives the positions of all the troops as far as the commander of that side would probably know them. In these narratives casualties should *always* be shown, or the commander would not know how his fighting troops had decreased, and the medical officer would not know how many wounded he had to deal with. Some Directors, many Directors in fact, forget this piece of necessary information, and the medical officer, for his own sake, should bring the omission to the notice of the staff officer.

A narrative is, of course, published for each side. To explain a narrative more fully I will read one of those published during the Staff College Ride to which I have been referring. It is a very good one, a very typical one, and, what is more, shows the casualties, which will be considered again in a few moments when I come to speak of evacuation of medical field units and hospitals.[1]

As soon as the narrative is issued the commander of each side writes his orders, his operation orders. There are other orders a commander may issue on service, such as standing orders and routine orders; but on Staff Rides he usually confines himself to operation orders, which, as Field Service Regulations, Part I., state, deal with all strategical and tactical operations, such as marches, protection, occupation of quarters, reconnaissance, and actual fighting. These operation orders also include such informa-

[1] Here the lecturer read and explained the narrative mentioned above.—EDITOR.

tion regarding supply, transport, ammunition, medical, and other services of maintenance, as it is necessary to publish to the troops.

Whilst the commander is writing his operation orders each officer will be given some form of indoor work to do from 5 p.m. until dinner time; for a medical officer it may be one of the following:—

(1) A medical appreciation of the present situation.

(2) Writing orders for insertion in operation orders, and orders or instructions to officers commanding medical units that are not necessary for all troops to know.

(3) A report on arrangements to be made for evacuating medical field units and hospitals.

(4) A report on hospital supplies and medical store depôts.

(5) A report on convalescent camps and rest stations.

(6) A sanitary report and recommendations. Position of sanitary sections and squads.

(7) Position and movements of hospitals, ambulance trains, hospital ships, and so on.

There are two of these about which I should like to say a few words before proceeding further, as they are both of some importance to medical officers, viz.:—

(1) The writing of orders and instructions.

(2) The evacuation of field ambulances and hospitals.

(1) For some years there has been great discussion and uncertainty as to how orders should be issued by officers holding administrative positions on the staff; as an example of this, I well remember some years ago having an argument on this point with a certain excellent Commanding Officer during a Staff Tour. Shortly afterwards I received the following order from the Assistant Director: "Explain in writing how orders should be issued on field service by a Principal Medical Officer." Armed with the King's Regulations, Regulations for the Army Medical Service, and Combined Training, I commenced my task. I finished it and gave it to the staff officer. I expected to have it returned to me before the evening conference commenced covered with red and blue pencil marks; it was, however, not forthcoming, and at the final conference the Director-in-Chief, to whom it had been sent for criticism, announced that he was taking my paper on orders back with him and would correct it later on. That was a long time ago, and I have not received the document yet, and do not suppose I ever shall. But to continue. In the JOURNAL OF THE ROYAL ARMY MEDICAL CORPS for May, 1908, I wrote as follows: "At present medical officers do not write operation orders . . . orders from staff medical officers are usually

embodied in the operation orders of the General Officer Commanding-in-Chief, General Officer Commanding the Division, or the General Officer Commanding the Lines of Communication. It would perhaps lessen the pressure on the General Staff, and save time and trouble,

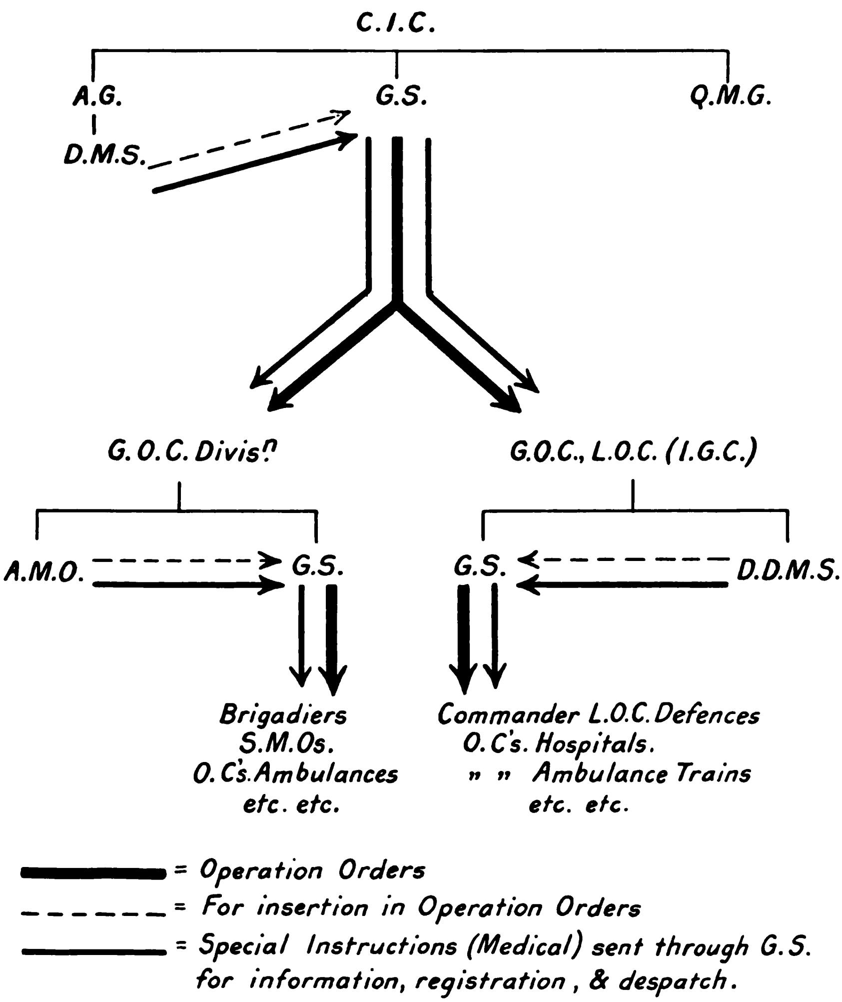


Fig. 1.

if only matters of interest to combatant troops were entered in operation orders; while other orders, directly concerning medical units alone, were issued by the Director of Medical Services, Deputy Director of Medical Services, or Administrative Medical Officer, in

their capacity of officers of the General's Staff," and suggested that these latter orders should be called "special instructions." This was followed by a diagram to illustrate my meaning, which I reproduce this evening. No explanation appeared in the Journal, and I wish to explain it now. (*Vide* fig. 1.)

I know officers find the writing of orders a great stumbling block, and I would refer them to Field Service Regulations (1909), Part I. Operations, chap. 2, section 12, para. 1. I have already quoted a part of this paragraph when speaking of the commander's operation orders; the concluding part is as follows: "but detailed orders for such services, which it is not necessary for the troops to know, should be issued to those only directly concerned."

In October of the same year, viz., 1908, a Staff Tour was held by the Chief of the General Staff, and in the report afterwards published, important decisions given by that officer were mentioned. Question No. 11: "How far should administrative orders be included with operation orders, and how far should they be issued separately?" was answered as follows: "It is not necessary that administrative orders should be included in operation orders. When it is not convenient to include them they can be issued separately when advisable, but when it *is* convenient, and does not cause undue delay in issue, such administrative orders as it is necessary for the troops to know may often be included in operation orders with advantage. It must be remembered, however, that the troops do not require to know the details of the regulations of the administrative services, and it will be practically always necessary to issue detailed instructions direct to the latter separately from operation orders." It further states that: "In cases of doubt, subject to any instructions the responsible Commander may give, it is the duty of the General Staff to determine what administrative orders, if any, should be included in operation orders. Practice and judgment in applying the general principles governing the issue of orders are the best guides."

I can say no more about this important subject of orders this evening, time will not allow, but I would advise officers before going on a Staff Ride to look up the matter in Training and Manœuvre Regulations and Field Service Regulations, Parts I. and II., especially pp. 19 and 20 of Part II., which deal with the preparation and despatch of orders, reports, and messages.

The second point I would ask you to consider for a moment is "The Evacuation of Field Ambulances and Hospitals."

For a long time I used to find it a great difficulty on Staff Rides

in estimating the amount of transport required to remove the wounded from the collecting zone to the evacuating zone, and so on down the line. All depended upon the severity of the wounds and the amount of transport obtainable. My classification of wounded did not quite satisfy me, and I was pleased to see Lieutenant-Colonel Macpherson's table in one of the Journals of 1907. I have worked in accordance with the figures he gave, and derived great help.

I do not think this table can be improved upon, so I advise all aspiring Staff Riders to follow it, and take a copy of the percentages with them when proceeding on a Staff Ride. I would also draw their attention to chap. 10, paras. 8 and 9, sect. 78, Clearing Hospitals, Field Service Regulations, Part II., where it speaks of the temporary fitting up of supply wagons and country carts.

To return to the evening's work. During the time the officers are doing the indoor tasks before mentioned, the commander is writing his operation orders for the following day and arranging reconnaissance work for each officer. Dinner takes place about 7 o'clock, and at 9 the senior officer present, either the Director, or Assistant Director, holds a conference at which he criticises the most important matters in connection with the commander's and other officers' indoor and outdoor work of that day and the previous evening, and answers any questions that he may be asked. After the conference, which usually lasts about an hour, the subordinate commanders and medical officer write their orders based upon those issued by the commander before dinner, and this ends the day's work. Should however, the medical officer find himself attached to the Directing Staff he will have none of the duties so far mentioned to perform, but will have many that are very responsible; for instance, he will have to visit and advise other medical officers when at work reconnoitring a position, surveying a town, or doing lines of communication work; later on, armed with a red and blue pencil, he will be correcting their written work or answering the Director-in-Chief's questions on medical matters in connection with other officers' work, and perhaps at 11 or 12 o'clock at night he will find himself going over the aforesaid medical officers' written work with the Director-in-Chief, who will criticise every detail most carefully and add his remarks. On the following morning each officer will, at about 9 o'clock, depart by train, motor, or cycle for the reconnaissance work ordered by the commander of his side, returning about 3 or 4 p.m. to write a report.

TABLE

To Show Arrangements probably required for the Removal of Wounded after a Severe Action.

(1) *Number of Casualties* (Extracted from a Narrative, Staff College Staff Ride, June, 1908).

	Killed	Wounded	Missing	Horses
Cavalry	30	120	10	80
I. Mounted Brigade	50	180	—	60
XIII. Brigade ..	15	40	—	
IV. Division ..	1	10	—	
III. Division ..	47	230	17	
II. { IV. Brigade ..	91	411	130	
II. { V. Brigade ..	73	394	112	
I. { I. Brigade ..	79	440	30	
I. { II. Brigade ..	80	512	45	
II. Mounted Brigade	20	107	37	

(2) *Table showing Casualties expected on Active Service and the Severity of Wounds* (*vide* Chap. x., Sect. 78, F.S. Regs., Part II., and R.A.M.C. Journal, 1907).

		Per cent.
Marching—No serious fighting.. (Daily. To Field Ambulances, to clearing Hospitals, and to Stationary Hospitals)	=	0·3
After general engagement ..	=	5 to 20
Proportion of killed to wounded	=	1 to 4
Wounded—Can walk	=	20
Require sittting-down accommodation	=	60
Require lying-down accommodation	=	15
Unfit for transport	=	5

(3) *To show Casualties in* (1) *worked out in accordance with percentages given in* (2), *a procedure necessary to determine transport required.*

Killed = 486 Wounded 2,444

Proportion killed to wounded = 1 to 5

Wounded.

Can walk	489
Sitting accommodation ..	1,466
Lying-down accommodation	367
Unfit to be moved	122
	2,444

The medical officer's outdoor duties vary, he may be ordered to report upon such administrative details as follows:—

(1) What facilities exist in such and such a town for establishing hospitals? What supplies are there in the town, and what additional medical assistance could be procured? or (2) to report upon a given site for establishing a hospital under canvas, and if not suitable to select another and report upon that; or (3) to report on condition of roads for transport, what rail and water transport can be employed, perhaps to select sites for dressing stations for an Infantry Brigade in action at a certain place, and to report upon camping grounds, bivouacs, water supply in close proximity; or (4) he may be ordered to select a suitable site for a clearing hospital, the report to be accompanied by a sketch showing roads from the field ambulances of a certain division to the clearing hospital, and from the clearing hospital to railhead; and many other such duties too numerous to mention.

To recapitulate the daily work of a medical officer, not on the Directing Staff, will be as follows:—

8 o'clock breakfast, 9 to 3 reconnaissance (lunch out), 3 or 4 to 5 p.m. write report on outdoor work, and hand to staff officer.

5 p.m., study fresh narrative and correct map.

5 to 7 p.m., indoor work, hand before dinner to staff officer. If required, assist commander with medical details for his operation orders.

7 to 8.30 p.m., dinner.

8.30 p.m., corrected work handed to officers by staff officer.

9 to 10 p.m., Director's or Assistant Director's conference.

10 p.m., staff officer collects corrected work.

10 to 11 p.m., write orders for insertion in subordinate commander's orders, and also instructions to medical units.

(6) The Staff Ride generally lasts about four days. On the morning of the fourth, or perhaps the fifth, the Director or Director-in-Chief meets the officers (of both armies if a double Staff Tour), at some selected place, some hotel, or near the final scene of operations, and there he discusses and criticises the work done during the previous days by the commanders, subordinate commanders, and other officers who may have attended. This ends the Staff Ride and officers return to their stations.

In conclusion, I would say that medical officers on Staff Rides should: (1) Pay great attention at first to the scheme, and afterwards to every narrative, and follow all strategical and tactical movements as closely as possible. (2) Know every order issued by

the Commander, and practice writing orders themselves. The art of writing good and clear orders is not learnt in a moment, and I contend no one can issue good operation orders or instructions unless he possesses a sound practical knowledge of all branches of the Service, his own in particular. (3) Assist commanders and subordinate commanders in writing medical details in their orders. (4) Remember the movements of his own field units and not send one unit to two places; this does not occur on manœuvres, but on a Staff Ride it is a common mistake, obviated by using the flags and pins before described. (5) Endeavour to grasp the idea of map-reading and sketching. Major Blenkinsop's articles in the Journal on this subject are most valuable. I might say as regards sketches an officer must be careful not to make a sketch just to show how well he can draw, it should be useful to illustrate a report, or to make a report more easily understood; just what is wanted should be drawn, and *not* a map of the country 50 miles round; such a sketch would only be confusing. The scale should be inserted and the North indicated. Like reports, sketches should be folded, not rolled, for obvious reasons.

I would here mention what creditable sketches and reports Majors Bray and Brown-Mason sent in on one of the London Staff Tours. I wish I had them with me to show you.

Casualties should be worked out very carefully.

As regards reports, I would recommend that all reports should be as short as possible and clear; if an officer does not think the place he has been reconnoitring good, or advisable, he should say so *at the beginning* of the report. The Assistant Director does not want to wander through a long report for no purpose, he would waste his time and probably lose his temper. A margin should be left for the Assistant Director or Director to write his remarks upon. Names of units should not be abbreviated too much. It is easy to confound Battalion for Battery, or an Infantry Brigade for an Artillery Brigade, if only Batt. or Bde. be written.

One must learn to "appreciate" quickly, for, as before stated, an "appreciation" may be called for at any moment; and also be prepared to give a lecture at any time to all the other officers on medical movements up to date. This happened to me once at Gloucester.

If on the Directing Staff correct all reports as soon as they arrive, and have them ready for the Director-in-Chief's criticism.

I would further say that throughout a Staff Ride we must bear in mind that it is our duty not only to put to the test the knowledge

we possess and try to gain more, but to find out by such very valuable experience where the weak points of our organisation lie, and bring them to notice, either through the pages of the Journal or by other means.

There are, in my opinion, still several matters that need further consideration, and cannot well be settled in an office, such perhaps as: (*a*) More explicit details regarding the writing and issuing of administrative orders. (*b*) The great necessity of a senior medical officer of a brigade being a separate appointment, and a certain designation for that officer, such as "Brigade Administrative Medical Officer. (*c*) The relation of the Assistant or Deputy Director of Medical Services to the Inspeotor-General of Communications and Commander of Line of Communication Defences. (*d*) More detailed arrangements for medical assistance to a retreating force and in savage warfare. (*e*) The necessary reserve of medical officers with divisional troops to provide for contingencies. (*f*) Medical assistance for independent and protective cavalry. (*g*) Increased medical assistance for batteries of artillery. (*h*) Independent transport for the clearing hospital; at present it is little more than a stationary hospital pushed forward; would it not be better as a divisional unit with transport? (*i*) Medical arrangements during bombardment of seaport towns, bomb-proof hospitals near fighting zone. (*j*) Bringing into line the British and Indian methods; and many others I cannot state just now.

I would remark here that one would like to hear more about *Medical* Staff Rides; such a ride to my knowledge has never been described in the Journal, and very rarely an account of any other variety. Considering the number of Staff Rides that take place, an account of one, with lessons learnt, might appear in each issue. However, I trust that what I have said this evening has been sufficient to give those officers interested an idea of what an ordinary Staff Ride is like. A paper like this, where time is limited, will not permit of my going more fully into details, such as strategic and tactical advance guards; various kinds of rearguards and rearguard actions, more explicit details respecting the writing of orders and messages; position of ambulances on the march; mobilisation; organisation of the Staff, and the Executive on the Line of Communication; further details of the medical service in the field; returns, &c., &c., all these matters, and many more, officers must learn from the various official and non-official books, and from continuous practice at field training exercises. To become proficient in our own branch it is necessary that we should know something of the working of

the other branches of the Service, especially the strategical and tactical methods employed. Being brought into daily contact with other officers and listening to their arguments and discussions, we learn a great deal of this when attending Staff Rides, and without any special application or effort we get to know the "run of things" pretty well.

Before concluding I would also remark that, as far as I know, medical officers of the Royal Navy do not attend military Staff Rides. Executive officers of the Royal Navy do so at the Staff College and elsewhere. As co-operation is so frequently needed between naval and military officers, and was experienced in the Kaffir, Zulu, South African and other wars, it would no doubt be very pleasing for army medical officers to sometimes have medical officers of the Sister Service working with them, and probably the pleasure would be reciprocated.

As regards the Territorial Army, no doubt some of its medical officers now present will tell us what facilities they are afforded for becoming proficient in Staff work.

With these few remarks I will end this paper, and trust that all those present, who have not attended Staff Rides, will find them when they do, as interesting, useful and valuable, and also as enjoyable, as many of us have in the past. I would also ask those officers, who *have* attended Staff Rides and who thoroughly realise, as we all must, that the practice of field organisation and field administration is quite as important for some officers (senior officers especially) as the study of surgery, pathology, or hygiene is to others, to write more of their experiences, their ideas, their criticisms and suggestions in the JOURNAL OF THE ROYAL ARMY MEDICAL CORPS, for the edification of those who are just as keen, but have not had the many opportunities that some of us have had, of learning their work practically at Manœuvres and Staff Rides.

DISCUSSION.

Lieutenant-Colonel MELVILLE, after thanking the lecturer for his most interesting paper, said that he wished merely to draw the attention of his brother officers to the fact that it was possible to do a great deal of useful work in the direction of Staff Rides, by any three or four medical officers who happened to be stationed together and who took an interest in the subject. He referred to some experiences of his own in this matter in India, when he and two brother officers derived much instruction from small afternoon rides. No expense was entailed by these rides, and he was of opinion that they should be habitually practised at all moderately

large stations. Officers would get much more value from the more formal and extended Staff Rides if they had already had some practice in the small way he referred to.

Sir Thomas Gallwey said the lecturer appears to think that Medical Staff Tours are unnecessary, but it is my experience, having directed tours of this description in the Aldershot Command, that they are most useful and all the officers who have attended them are unanimous in their favour. A Medical Staff Tour is conducted on nearly similar lines to other Combined or Mixed Tours, but is more like a Regimental Staff Ride, and many more details can be thrashed out than in the large tours when it is quite impossible to devote much time to the administrative services. The General Staff have a tendency to leave lines of communications severely alone and develop battle tactics, which, in my opinion, are not as useful for instructional purposes for the administrative services as lines of communication. Besides, in our purely Corps Tours we can cover the whole ground, freely discuss all details, and cause each officer to act as D.M.S., D.D.M.S., A.M.O., and O.C.F.A., on the three or four days the tour lasts. The drafting of orders for insertion in operation orders, and the issuing of Corps orders are all gone into. Also the details of sanitary organisation with the field army and on the line of communication. It is the experience of all the officers who have been out with me and also of the General Staff who have been on the Directing Staff that a very great deal of information has been gained on these tours and there is no doubt whatever of their beneficial effects on all concerned. The keeness of our officers has always been most striking, and has been the subject of constant remarks by the General Staff. The lecturer suggested that these Medical Staff Tours should be published, but the only thing I have done in this direction is to circulate the Aldershot Tours to other Commands, and it must be remembered that they are only Corps as compared with Combined Tours, and may not therefore be so interesting to other branches of the Army. Besides, the reports and comments are rather bulky and do not lend themselves to publication. They have been forwarded to the War Office on each occasion, and we have had the satisfaction to learn that they have been much appreciated, but they have not been printed and issued, simply because they are only Corps Tours, I suppose. It could not be expected of the War Office to publish Corps Regimental Tours. I would say in conclusion, that Medical Staff Tours are an extremely useful training for medical officers, and are, in my opinion, essential as a preliminary preparation for medical officers taking their place in the larger or combined Staff Rides.

Colonel Woodhouse described his method of carrying out Medical Staff Rides at Netley in July and August, 1909. He laid stress on officers, before being detailed to attend such rides, being thoroughly grounded in all regulations bearing on field Medical organisation, map-reading, rough field-sketching, &c. He also made some remarks about

medical "appreciations," and the drawing-up of orders by administrative medical officers of divisions for inclusion in operation orders.

Major S. Guise Moores said that the Administrative Medical Officer of a Division had as complete and similar powers as to the disposition of field ambulances as the General Officer Commanding Artillery had with regard to his batteries. A wise Administrative Medical Officer would (especially when a battle of encounter was expected) hold a field ambulance, or certain sections of the same, in reserve. Additional support might be required at either flank, or in the centre, on the day of battle, and should be available for instant despatch. It is not an uncommon practice for officers, detailed to act as Administrative Medical Officers of Divisions on Staff Tours, to dispose of their entire command by detailing one field ambulance to each infantry brigade before fighting begins; thus leaving nothing in reserve for emergency requirements. It is difficult, nay almost impossible, to get back a field ambulance once the General Officer in command of a Brigade has got it fixed in his mind that the field ambulance has been detailed in orders to accompany his Brigade. The lesson to be learnt is, that it is always advisable to have "something up your sleeve," and so ensure the rapid transference of medical aid to that part of the field where it is most needed.

Clinical and other Notes.

THE CURATIVE SERUM TREATMENT OF ENTERIC FEVER.

By Lieutenant-Colonel M. W. O'KEEFFE and Captain E. G. R. LITHGOW.
Royal Army Medical Corps.

Those of us who have had much experience of the treatment of enteric fever have realised with disappointment how very little influence any drug has on the progress of the disease.

The sanguine and enthusiastic expectations held out by some authors as to the good effects of dozens of different antiseptics and other drugs have proved to be futile. Medicines having been found as useless in enteric fever as in Malta fever, we naturally eagerly looked out for some other means of lessening the mortality of this scourge to our troops.

We were very much struck by a report on the curative serum of M. Chantemesse, by Lieutenant-Colonel Leishman, R.A.M.C., in the March, 1908, number of our Journal. The paper, by M. Chantemesse, was read before the International Congress of Hygiene, Berlin, and the results announced, Lieutenant-Colonel Leishman states, were "sufficiently striking to arrest general attention."

Last year a large number of troops passed through Rawal Pindi on their way to the Mohmand and Zakka Khel Expeditions, and enteric fever was unusually prevalent in a severe form in this station. This was also the case all over the North of India.

An application was made to M. Chantemesse, of Paris, for some of his serum, but a polite reply was received to the effect that he wished to have the administration of the serum under his personal observation for a longer period before supplying it to others. It was ascertained that Messrs. Burroughs Wellcome and Co. manufactured a curative serum of a similar character, and no difficulty has been found in obtaining from them a full supply in 25 cc. bottles.

We have been trying this serum for the last six months with, in the majority of cases, a striking and excellent effect. But the amount of clinical material in Rawal Pindi this year has been much too small to enable us to arrive at any definite or dogmatic conclusions.

Most of the troops have been inoculated with anti-typhoid vaccine, and there are only about one-third the number of cases this year up to date as compared with last year, and only one death as compared with seven last half year. It is for this reason that we have ventured at this early date to publish a preliminary report, as it is hoped that the treatment may receive a more extended trial throughout India. The principle

is the stimulation of the patient's leucocytes by the curative serum, thereby increasing their capacity for the destruction of the invading bacilli. It was found impossible to get any definite information as to the exact dose. At first great caution was exercised, and only 5 cc. were injected in the flank; the dose was gradually increased to 20 and 25 cc., and in two cases, where the patients were strong men with good circulation, 50 cc. were given without any ill-effects. The 50 cc. is considered an unnecessarily large dose, and 25 cc. is sufficient for all purposes.

Soon after the injection the reaction sets in, when the temperature may temporarily go up a degree or two; this is followed by a steady decline, which commences on the second or third day, there being no sudden drop.

In most of the cases there was a marked improvement in the toxic symptoms, the patient seemed and felt much better. This improvement was particularly noticeable when cerebral symptoms were prominent, the delirium ceasing, the patient becoming conscious and taking an interest in his surroundings. A somnolent effect was also produced, the patient generally sleeping heavily and peacefully for several hours after the injection. Tympanitic symptoms soon subsided.

It is most important that the treatment should commence at as early a stage as possible; if given early, typical typhoid symptoms rarely set in. One dose will then be sufficient; another dose may be given after ten days' interval. If the case be at an advanced stage when first seen, it may be necessary to give a second dose with only two or three days' interval; the second injection should be only half the amount of the first. M. Chantemesse's statistics are remarkable, the mortality being as low as 4·3 per cent. He states he has never lost a case in which the serum was administered in the first seven days; he treated over 1,000 cases, so his results are worthy of all attention and respect.

India would seem to be a particularly suitable field for a thorough and extensive trial of this treatment, especially during the months of September and October, when there is generally a recrudescence of the disease, probably due to the increase in the number of flies. The serum keeps well in the hot weather, but if more than a month's supply is on hand it is advisable to store some of it in a hill station. The cost is Rs. 4.8 per 25 cc. bottles. If the reaction be excessive and the temperature goes above 102° F., it should be reduced by means of sponging with tepid and cold water. The following notes on a few of the cases will serve as an illustration of the treatment and its effects:—

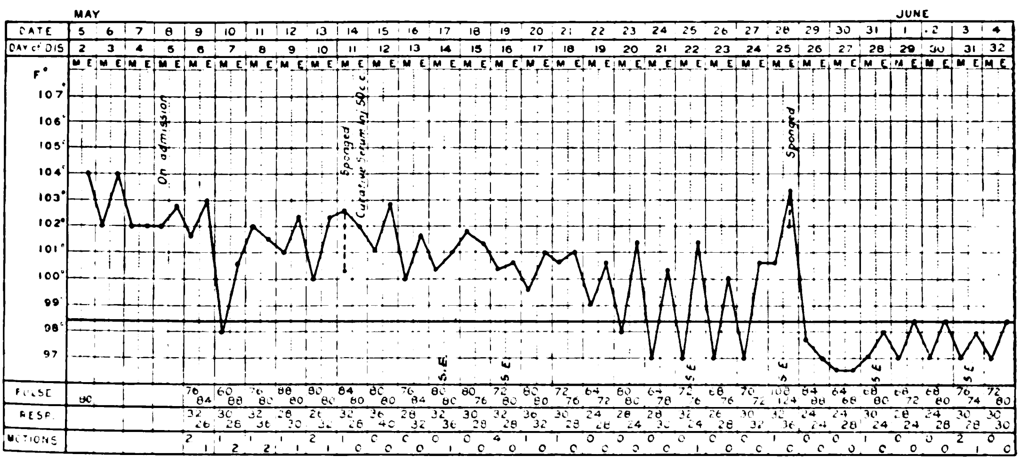
Case 1.—Lieutenant B., of the Royal Engineers, was admitted to the Officers' Ward, Station Hospital, Rawal Pindi, on May 9th, 1909, with a history of having been ill for four days with high temperature, headache, pains in the limbs, and diarrhœa.

On admission, the patient was flushed, dull, and apathetic; his tongue was tremulous, thickly furred, cracked and dry. On his abdomen and

thorax a marked roseola was noticed. Tympanites and diarrhœa were also present, the motions passed being typical of typhoid fever. The patient complained of little else than sleeplessness. He was fed with whey.

For diagnostic purposes 5 cc. of blood was withdrawn from the basilic vein and placed in 10 cc. of a bile, glycerine, peptone medium, which was sent up to the laboratory at Murree. The *Bacillus typhosus* was isolated.

On the 14th the patient was extremely drowsy and inclined to wander; the tongue was very tremulous and his general condition suggested the onset of delirium. It was decided to give 50 cc. of Burroughs Wellcome and Co.'s curative serum, in view of the good results previously obtained in other cases; 25 cc. were injected into each flank. Next morning his

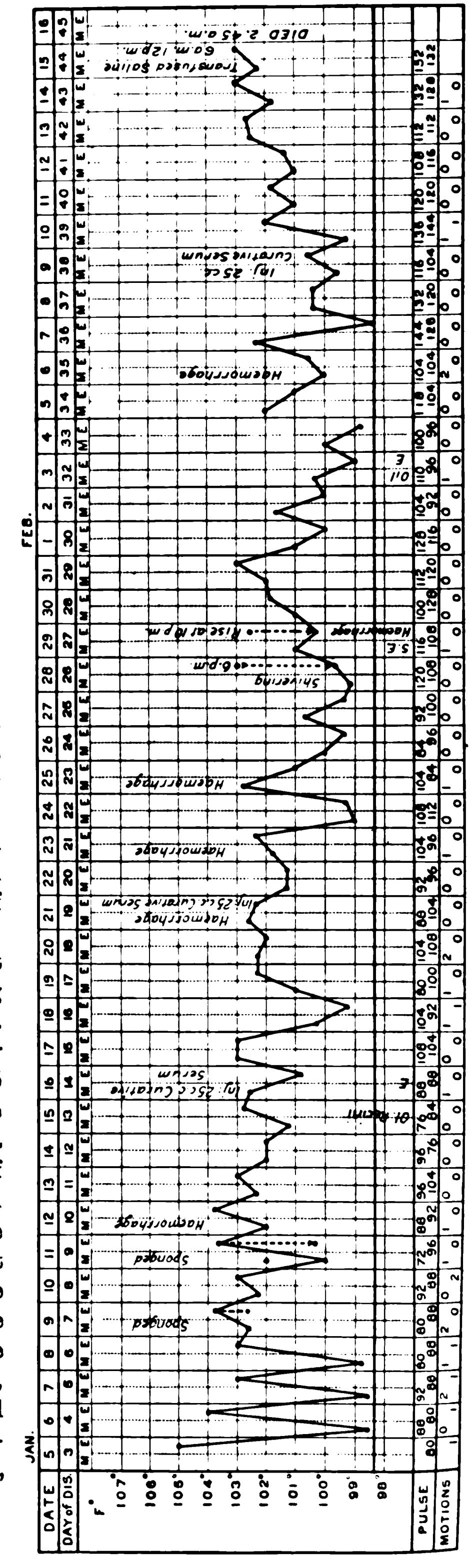


CASE 1.

general condition improved. He passed a good night and was apparently quite clear in his mind and stated that he felt much better. On the 16th the temperature had fallen to 100° F., and thereafter kept at a lower level than previous to the serum injection. From now onwards the patient's condition rapidly improved; convalescence was uneventful, except for a rigor which occurred on May 28th. The blood was examined for malarial parasites with a negative result. He was eventually transferred to the Murree Hospital for climatic reasons, and has since made a good recovery.

CASE 2.—Private H., No. 3 Mountain Battery, Royal Garrison Artillery, was admitted to the Section Hospital, West Ridge, on January 8th, 1909, and sent on to the Station Hospital next day. He gave a history of fever, headache, and constipation of several days' duration. On admission he

was dull and apathetic and had a thickly coated tongue and the general heavy look of an enteric fever patient. There were one or two spots on the abdomen which would give a duration of about eleven days to the disease. The patient was placed in the enteric ward and fed with whey. A capsule of his blood was sent for examination. The result of this was negative, and this factor necessarily influenced the prognosis, as clinically the case was undoubtedly one of enteric fever. On the 12th the patient had a small hæmorrhage; dark clots were passed. Morphia was given and feeding with whey restricted to two pints a day. The same evening a second hæmorrhage took place and he passed about a pint of blood, and soon became collapsed and irritable, but quieted down after receiving a second injection of morphia. He was only allowed water and cold tea to drink and 15 grains of calcium chloride were given three times a day. On the 14th, 25 cc. of curative serum (B. W. and Co.) were injected. In the evening there was distinct mental improvement. The drowsy toxic typhoid state had completely gone. The patient was quite sensible, looked about the ward and appeared to take an interest in things generally,



Case 2.

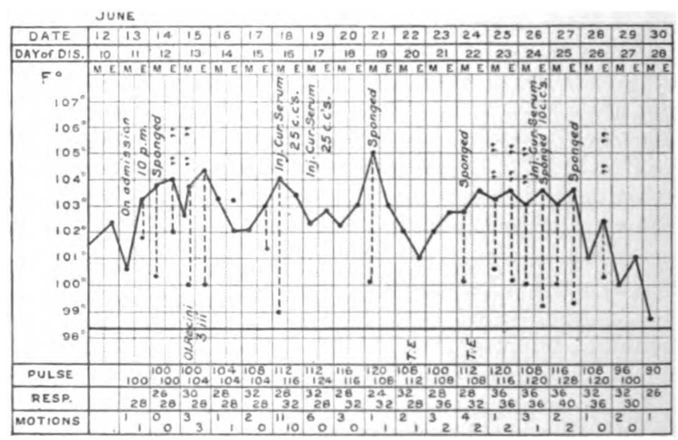
quite unlike an ordinary case at this stage. On the 18th there was considerable congestion of both lungs and he had a short dry cough. Mist. expect. stimulant, to which two drops of tinct. digitalis were added, was given every four hours. On the 20th the patient showed signs of nervous exhaustion, but the lungs were clearer and there was less cough. A second injection of 25 cc. of curative serum was given on the 21st. Later on in the day he reacted to the serum in much the same way as on the previous occasion. On the 23rd some old blood clots were passed, probably the remains of the last hæmorrhage. His mind was quite clear and there was a remarkable absence of toxic symptoms although it was the 21st day of the disease. Another hæmorrhage took place on the morning of the 25th. The patient became very pale and collapsed, and the pulse was rapid, weak, and irregular. Morphia was given, hot-water bottles applied, and the foot of the bed raised. He gradually came round, but looked almost bloodless, and his condition was very critical. On the 29th, there was a mass felt in the sigmoid region which was thought to be blood clots. A small oil enema was ordered, with a view to its removal. On the 30th, the oil enema brought away a mass of dark blood clots and the mass in the sigmoid region disappeared. On the 31st, he complained of pain in the right elbow which looked red and enlarged. On February 1st, the right elbow and left leg were both swollen; no thrombosed vein could be detected. There was a friction sound audible over the pulmonary valve. On the 5th, the murmur was not detected and his condition improved.

A large hæmorrhage occurred on the 6th, followed by the usual collapse. After treatment the patient gradually came round. On the 9th, 25 cc. of anti-typhoid serum were injected. The patient's condition next day was very critical. He did not react to the serum to any marked extent this time. On the 14th, vomiting set in, and the whey and meat juice given were not retained. He was ordered injections of strychnine and digitalin every six hours. During the evening of the 16th the patient's condition was very bad, and an intravenous saline injection of about 5 pints, containing 2 ounces of brandy and $\frac{1}{50}$ grain of digitalin, was given. An improvement set in, but it was only temporary; the patient gradually sank, death taking place at 2.45 on the morning of the 16th. Attention is drawn to the fact that in this case the serum treatment was commenced in a late stage of the disease.

Although this case terminated fatally the influence of the serum on its progress was striking, his tongue was clean, and many other of the usual symptoms of enteric fever were absent. He sank from sheer exhaustion, due to repeated hæmorrhages, on the forty-fifth day of the disease.

Case 3.—Lance-Corporal L., 1st Royal Sussex Regiment, was admitted on June 13th, 1909, to the enteric fever ward in the Station Hospital, Rawal Pindi, with signs and symptoms pointing to a severe attack of enteric fever. Numerous "crops" of rose spots were present on the

thorax and abdomen, suggesting that the case had partaken of an ambulatory character for at least eleven days previous to admission. Patient was put on 5 ounces of whey every two hours and a turpentine mixture was given. A capsule of blood was sent for examination as to a Widal reaction; result = 1 in 40 (incomplete). His condition on the 18th grew much worse. Temperature 104° F.; pulse 116 and weak; tongue very dry and tremulous. Low muttering delirium and subsultus tendinum were present. Tympanites was also much marked, and stools and urine were passed involuntarily. Feeding with whey was stopped, only brandy and water being given. Turpentine stupes were applied to the abdomen, and 25 cc. of anti-typhoid curative serum (B. W. and Co.) were injected



CASE 3.

into the right flank. The same evening there was a marked improvement of the mental condition, the delirium disappeared, and natural sleep was induced. The temperature next morning had fallen and tympanites was absent; whey feeding was recommenced, and 25 cc. of the same serum were injected into the left flank. The patient's appearance was unexpectedly good considering that he was about the end of the third week of the disease. The hot weather experienced was also not calculated to benefit the patient. The stools and urine were still passed involuntarily and both were greatly increased in amount.

On the morning of the 21st the temperature rose to 105° F. Patient was not so well, pulse weak and irregular. Tympanites was again marked. He was ordered hypodermic injections of liq. strych. hydrochlor. ♏ 5, and ether ♏ 15, alternately every four hours. Whey feeding was stopped, brandy and water only being given. Turpentine mixture and stupes were continued. Sponging with tepid water was carried out whenever the tem-

perature rose above 102° F. On the 22nd, the pulse had much improved, and strychnine only was given. Whey feeding was recommenced, the tongue was still extremely dry and tremulous. Delirium was present to a slight degree. His head was shaved and an ice-bag applied; his temperature was kept down by sponging. On the 23rd, strychnine and ether injections were recommenced, and given alternately every six hours. Tympanites being still troublesome, a rectal tube was passed and some flatus escaped. Later a turpentine enema was given with a more successful result. The bases of both lungs were congested. The turpentine mixture was omitted, and a mixture containing ipecacuanha wine, ammon. carbonate, and peppermint was given instead. On the 24th, the tympanites entirely disappeared. The patient slept well and the temperature showed a tendency to rise. Strychnine and ether were given alternately every four hours. On the 25th, the temperature still maintained a high level. The patient was restless and noisy during the night, and got very little sleep. The pulse was 120, and somewhat irregular. There was tympanites. Large quantities of urine were passed involuntarily.

A capsule of patient's blood was again sent for examination as to a Widal reaction. The result was positive 1 in 40, 1 in 80, and 1 in 160 (incomplete), which would seem to indicate that as a result of the injections of the curative serum, the agglutinating power of the blood had been considerably raised.

His condition on the 26th was unchanged; temperature 103° F.; pulse 120 and dicrotic; respirations 36; 10 cc. of serum were injected into the left flank at 8 p.m. He was ordered 10 grains of trional, which was repeated at 10 p.m.

On the 27th patient was better; he had slept well during the night.

The temperature on the morning of the 28th fell to 101° F.; pulse 108; respirations 32. The patient was not so drowsy; his mind was much clearer, and he appeared to be quite sensible at times. He was given chicken essence and sanatogen ʒiii. daily.

On the 28th the temperature fell to 100·2° F. and pulse 96; respirations 32. His mental condition was much improved, and there is now every prospect of a favourable termination.

The following precautions in the administration of this treatment are advisable.

The condition of the circulatory organs should receive the most careful attention; any sign of cardiac weakness or a fluttering and tremulous pulse with tendency to syncope would most decidedly indicate the necessity of reducing the dose. Where none of these symptoms are present, a dose of 25 cc. can safely be given; otherwise not more than 10 or 15 cc. should be given.

M. Chantemesse describes as the result of the serum an intense destruction of typhoid bacilli and a consequent liberation of their toxins. These toxins sometimes tend to produce syncope and cardiac failure,

which can generally be counteracted by the free use of strychnine, hypodermically, and full doses of brandy. If the reaction does not take place and the course of the temperature is uninfluenced, in the absence of cardiac symptoms a second dose of half the amount of the first may be given with only a two or three days interval. As a rule, a ten days' interval should be allowed.

A PLEA FOR THE REGISTRATION OF ENTERIC CARRIERS.

By Captain J. C. G. CARMICHAEL.
Royal Army Medical Corps.

It does not appear to me that advantage is being taken of our recent knowledge of enteric carriers. I believe that it is now universally acknowledged by the profession that an enteric patient may, for a great many years after recovery, periodically pass large numbers of typhoid bacilli in his stools and urine. Taking this for granted, there are means at our disposal, whereby we might hope to minimise the chances of infection by these carriers.

The first step in the right direction has already been taken in India. I refer to the following:—

Standing Orders for the Military Medical Services in India, 1908, para. 142 (*a*) . . . . No man who has recently suffered from enteric fever should be so employed (whose duties entail the handling of food intended for British troops, in kitchens, officers', and N.C.O.'s messes, regimental and other institutions, and club, government, and regimental dairies, bakeries, mineral water factories, &c.) until it has been placed beyond all doubt, by repeated bacteriological examinations of fæces and urine, that he no longer harbours the *Bacillus typhosus*.

In cases where means for carrying out such examinations are not available, these men must not be employed.

I would like to see the above order added to our Home Regulations, but the wording "who has recently" might well be altered to "who has ever."

For the past five months I have worked on this plan; my method of procedure has been as follows:—

The commandant was requested to have the following added to garrison standing orders:—

29. Medical inspection. As soon after the arrival of detachments as possible, the companies will make arrangements with the medical officer for the inspection of their men. Nominal rolls and medical history sheets to be sent with them.

30. N.C.O.'s and men who have at any time suffered from enteric fever, are on no account to be employed in cookhouses or in the distribution of food.

As one already inspects all arrivals and departures, the inquiries for carriers add very little to one's work. I ask each man if he has *ever* had enteric or typhoid fever, purposely giving both its names, for many men only know the disease by one or other name, but not by both.

Having seen all the men of a detachment, I inform the officer, if present, and always each colour-serjeant, that all those men who have suffered from enteric should not be employed either in the kitchen or as orderly men. The orderly man I consider even a more dangerous source of infection than the cook. To give a simple illustration:—

An orderly man, immediately prior to drawing the bread ration for his barrack-room, enters the urinal and soils his fingers, now he handles the bread which other men eat, and, if an enteric carrier, infects the bread. In my humble opinion this is one of the chief causes of sporadic cases.

The number, rank, name, regiment, and date of disease of those who answer in the affirmative I then enter in a book. This might well be kept up in all military hospitals and called the Enteric Carrier Register.

In the case of regulars, their statements are verified by reference to their medical history sheets. Irregular troops (Special Reserve, &c.), on the other hand, rarely show entries on their medical health sheets.

The enteric carrier register might be worked on the same method as the syphilis register, new cases and transfers being dealt with as in the latter case.

Each regiment, battery, &c., should keep a nominal roll of their own carriers, and colour-serjeants might be held responsible that none of these men are detailed as cooks or orderly men. Of course, there are many people who object to all innovations, but I think the great majority of officers of all branches of the Service would soon take an intelligent interest in the system.

The few commanding officers to whom I have had an opportunity of explaining the mysteries of the enteric carrier have, without exception, manifested real interest. I must explain that this station (Fleetwood), although it has only a permanent garrison of fifty-four N.C.O.'s and men, yet as a musketry centre is much used by both Regulars and Special Reserve, the latter camping here during five months. Approximately 3,250 N.C.O.'s and men have been here during the last five months, and of these 122 were possible enteric carriers, which gives 3·75 per cent.

I feel sure that my total of 122 possible carriers is an under-estimation, for many soldiers seemed reluctant to admit having had enteric fever until they were informed that the admission would do them no harm. Of the 3,250 men, 2,470 were encamped here, and in the case of the camp, I invariably questioned all civilian mess waiters, civilian servants, civil canteen attendants, &c., *re* enteric fever. Four civilians had had enteric, three of them being cooks. They were given other employment.

Reviews.

MILITARY SANITATION FOR SOLDIERS SERVING IN HOT CLIMATES. By Major Robert J. Blackham. Thacker and Co., Ltd., Bombay and London, 1909. Pp. v. and 143. Price 5s. net.

These lectures are designed as guides for unscientific people, and the first requisite of such is that they should be definite and precise. In speaking of the storage of water in barracks, Major Blackham says, "A canvas bag with a tap and locked cover has much to recommend it," "the ordinary Indian surahi is not bad," and after all does not definitely say what he considers the best method. Destructive criticism of existing methods is not the business of the sanitary officer unless he has some constructive policy of his own which he can put forward. It is rather cold comfort for the keen company officer to be told here that he must work out his own sanitary salvation, and that the "medical officer can do no more than indicate the risk of pollution to which water is exposed when stored." A medical officer can do much more, and must do much more, if he hopes to prevent disease. Far better for him to be dogmatic, and say, "This is the way; walk ye in it," than edge himself out of all executive responsibility in this manner. Some of Major Blackham's statements are liable to question. Does he really seriously believe that drinking water in large quantities throws a strain on the excretory organs, especially on the kidneys? This is certainly not the generally received opinion. On the question of disposal of excreta Major Blachman again maintains an open mind. One system is "attractive and will probably eventually solve our difficulty," but "under existing conditions it possesses grave difficulties"; another is "worthy of consideration"; on the third he is even more vague. That is the leading fault of the book. It does not give the soldier definite guiding principles on which to model his life—merely vague statements, mostly of the opinions of other people, not even in most cases of Major Blackham's opinions. And why, oh! why does Major Blackham introduce a comic relief? Sanitation is a serious art, and the danger is that the soldier may not recognise it as such. To speak of the female mosquito as a lady "doing her work quietly as a lady should," "like most of her sex, fastidious in her dislike of draughts," is undignified and unnecessary. Perhaps such statements sound less objectionable than they look; read by the cold glare of the electric light they lose any possible attraction they ever can have had.

C. H. M.

TROPICAL MEDICINE AND HYGIENE. By C. W. Daniels and E. Wilkinson. In three parts, with coloured and other illustrations. Part I., Diseases due to Protozoa. London: John Bale, Sons and Danielsson. Pp. iv. and 264. Price 7s. 6d. net.

The appearance of a new English book on Tropical Medicine and Hygiene cannot fail to arouse interest, the more especially when one of the authors is already known as the writer of so valuable a handbook as Daniel's "Laboratory Studies."

The special aim of the authors, according to the preface, is to lay stress on the hygienic side of the problem of tropical disease, and it is natural for one to turn in the first place to the parts dealing with prophylaxis, to see how far they have accomplished their task. The chapter on Malaria is excellent, and the only criticism one has to make is that the matter is not arranged systematically, for example, one finds a little bit about malarial parasites in the first chapter, a little more in the second, and fuller details in the fifth. Similarly, a portion of the information on mosquitoes is found in the sixth chapter and the remainder in the appendix. This lack of orderly arrangement exists throughout the book more or less, it leads to frequent repetition, and causes not a little irritation to the reader. In the prophylaxis of malaria it is a pleasure to notice that the writer insists on all preventive schemes being based on a knowledge of the Anophelines which are carrying the disease in that particular locality and on their habits. If this were more frequently remembered there would be fewer of those failures in malarial prophylaxis which result from "blunderbuss" methods directed against water-bred insects in general.

In the chapter on Kala-azar one is surprised to see no mention of Nicolle's work in Tunis. The last chapter on Intestinal Protozoa gives one the impression that the writers have wearied of their work; one gets a somewhat confused account of amœbæ, then half a page on liver abscess, back to the reproduction of *Amœba coli*, some few remarks on amœbic dysentry, then a final word or two, totally inadequate, however, on liver abscess. It is presumed that these subjects will be treated in more detail in the succeeding parts of the work, in that case it would have been better to have left them out of this volume altogether. The appendix includes a classification of the diptera which may be useful for reference to those who are already familiar with entomological terminology. The illustrations are few in number and mostly poor. One is prejudiced from the beginning by the coloured frontispieces. The pictures of the blood corpuscles, for example, are either drawn from very poor specimens or else they are very badly drawn, an extreme picture is that of an eosinophile leucocyte, it is supposed to be stained by Leishman's stain, yet the nucleus is pale mauve in colour, and the granules are imperceptible except on very close inspection; the pictures of myelocytes on the same plate are quite the most wonderful examples of artistic licence that it has been our lot to notice in a scientific work. Taking it altogether, however, spite of the drawbacks to which attention has been directed, the book is worth reading, and very often presents the subject in a new and refreshing fashion, but it would be all the better if it were rearranged and the last chapter rewritten.

W. S. H.

Mosquito or Man? The Conquest of the Tropical World. By Sir Rupert W. Boyce, M.B., F.R.S. John Murray. Pp. 267. Price 10s. 6d.

This work is a more or less popular dissertation on the part played by insects and the lower animals in the propagation of tropical diseases. By far the larger part of the work is devoted to the mosquito and the diseases for which it is mainly responsible—malaria and yellow fever—and long and detailed accounts are given of the methods employed for their extermination.

The work of members of the Liverpool School of Tropical Medicine is, as is perhaps natural, brought so prominently to notice in this connection that the book loses much of its general interest.

It is also to be regretted that the same accuracy and care in quoting the names of Liverpool workers has not been observed in mentioning the names of their investigators. J. C. K.

SYPHILIS. By Sir Jonathan Hutchinson, F.R.S., &c. London: Cassell and Co., 1909. Pp. xxiv. and 583. Price 10s. 6d. net.

Considering the vast importance of the discovery of the *Spirochæta pallidum* as the cause of syphilis and the significance of its demonstration as a means of diagnosis, one would have expected more than a passing allusion to it in a work of this description; Wassermann's reaction test, also, is but briefly mentioned in the appendix.

Needless to say, the description of syphilis in all its phases is excellent, and its symptoms are very accurately detailed. As regards treatment, the author practically confines himself to the ingestion method of giving mercury, saying: "I believe that he who has learnt how to prescribe grey-powder and iodide of potassium will generally act for the advantage of his patients if he ignores all acquaintance with inunctions, baths and hypodermics." Further on he alludes briefly to the inunction and to the intramuscular methods of treatment and condemns both. F. J. L.

PUBLIC HEALTH. Catechism Series. By W. Robertson, M.D., D.P.H., Medical Officer of Health, Leith. Edinburgh: E. and S. Livingstone. Five volumes, in parts, 1 to 5. 1s. each, or 5 parts bound in cloth, 4s. 6d. net.

As stated in the preface, this work is intended for the use of students preparing for the examinations in medicine and for the Diploma of Public Health. For the first purpose it might be of use, but for the Diploma of Public Health the information supplied is not nearly full enough. Many of the subjects dealt with are not now considered of much importance, while more important subjects, such as sewage disposal, are dismissed in a few lines. Sewage farms are not so universally adopted as to merit the attention paid to them, while up-to-date methods of sewage disposal are hardly mentioned. No mention is made of the conclusions arrived at by the recent Commission on the subject. The work is of value from the point of view of acquiring a knowledge of elementary hygiene, and also because it brings together information which would require a search in many books to discover. C. S. W.

SOME COMMON REMEDIES, AND THEIR USE IN PRACTICE. By Eustace Smith, M.D. London: H. K. Lewis, 1910. Crown 8vo. Pp. vii. and 112. Price 3s. net.

This valuable book by so well known a physician, will fully repay careful perusal. It consists of a series of reprints from the *British Medical Journal*, of papers contributed at intervals during the years 1908 and 1909. The remedies dwelt upon are tartarated antimony, oil of turpentine, iron remedies, alkalis, antispasmodics, opium and salicylate of sodium.

There is no doubt that, to use the author's words, the new subject of bacteriology has come to occupy a disproportionate space in the mind of

the student, and that in his devotion to it, he is led to neglect general treatment altogether, and to forget that when patients come to him for advice, they expect to be cured. Many students seem to be of opinion that when they have made a diagnosis their duty is at an end, and that the most exacting patient can ask for no more. While those who proceed to treatment, if they order drugs at all, do so in a haphazard way, evidently little aware of the capabilities of the remedies they employ, or of the necessity of suiting them to the condition they are expected to relieve. One fully agrees, from one's own experience in the Service, with the author's statement that every drug has many different uses, and may be made beneficial or the reverse according to the judgment and knowledge with which it is prescribed. This, the young practitioner, when he has left hospital practice behind him, and turns his knowledge and abilities to private work (or work in the Service) soon begins to discover. He quickly finds that his ignorance of general therapeutics is a source of continual embarrassment, and he is driven late in the day to make good his deficiencies, and acquire some definite working knowledge of the remedies with which he is expected to deal.

The book is written in a pleasant and scholarly style, and well printed. It is of small size, a matter of consideration to officers who serve abroad, and it is replete with most valuable information. In particular, the administration of some of the remedies mentioned in connection with the diseases and ailments of children are dwelt upon in such a manner as cannot fail to be of great service in the treatment of such class of cases.

F. M. M.

The Causation of Sex. By E. Rumley Dawson. London: H. K. Lewis, 1909. Demy 8vo. Pp. xii. and 196. Price 6s. net.

Apart from the fact that the author attempts to explain one of the most fascinating of biological problems, this is a very interesting book. Around the relatively few facts known concerning the causation of sex, many theories and hypotheses have been built. The greater number were based upon various assumptions, the direct outcome of a belief that the influence of environment was all-powerful in the determination of sex. Dr. Rumley Dawson opens up quite new ground, in that he excludes the influence of environmental factors altogether. In this he is quite in harmony with modern Mendelian investigation, in so far as he ascribes the determination of sex to the inherent nature and structure of the gametes, but he differs fundamentally from the Mendelian conception in that he denies that the male exercises an influence in the causation of sex, but affirms the influence to be exercised wholly by the female.

The theory advanced is that the female produces both male and female ova, the male being emitted from the right ovary and the female from the left. It is further assumed that only one ovary ovulates each month, so that one month the right ovary is discharging male ova, and the next month the left ovary will discharge female ova. From these premises, Dr. Dawson proceeds to show that, in normal cases, if we know the sex and date of birth of a first child, the sex of the following children can be predicted for any particular month, and, therefore, a boy or a girl can be begotten at will. Thus, if ovulation occurs every twenty-eight days or thirteen times in each year, it follows, on this theory, that in every

succeeding twelfth month, the sex of the offspring will be the opposite of that in the first month. If in any March a girl be born, then if a birth should occur in the following March, the expectation is that it will be a boy. In support of this theory, the author adduces much clinical evidence and also analyses of the domestic events in the families of certain eminent persons, notably those belonging to our own Royal Family and to that of the Tsar of Russia. Before reviewing this book, we have made personal inquiries into the facts concerning three families as to which the data were readily available. In two of them, the sexes of the children born are absolutely in accord with the theory of Dr. Rumley Dawson. In the third family, two out of five predictions are falsified. It is obvious that the theory must not be criticised too severely on the basis of a few exceptions, for ovulation may have been irregular, or some disturbing cause may have interrupted the normal sequence.

We confess the evidence available from this book and from our own observations is suggestive, but it is not conclusive. We need to have accurate analyses of a large number of families, taken at random, before we can form any definite opinion as to the real merits of the theory. At the same time, we cannot ignore the fact that recent Mendelian experiments show that the male does influence the determination of sex, and we think the author goes too far when he asserts "that the male has nothing to do with the causation of sex." He asks us to believe that there is a fundamental difference in the nature of male and female sex cells. The evidence, as a whole, lends little support to that assumption. Further, he implies a difference in the structure of the right and left ovaries, and inferentially that there is structural and physiological asymmetry. We know there are marked asymmetrical arrangements in normal forms of both man and the lower animals, but so far we fail to see the evidence which proves the existence of asymmetrical physiological activity in the human female. These objections are advanced in no captious spirit; we have been much interested in the book and are fully alive to the difficulties with which the author has had to contend. It is a book which every medical man should read and think over. He can do even more than that; he can note facts, and from the data collected put the theory of Dr. Rumley Dawson to the test. If the theory can pass successfully through the ordeal of experience and careful analysis, it will have far-reaching influences.

R. H. F.

Current Literature.

Epidemic of Typhoid Fever in the 10th German Army Corps in the Summer of 1909.—In the *Deutsche Militärärztliche Zeitschrift* of November 20th, 1909, Generalarzt Dr. Hecker and Stabsarzt Professor Dr. Otto give an account of an epidemic of typhoid fever and the means adopted to check it.

On July 8th a report was received by the principal medical officer of the corps that four suspicious cases of typhoid fever had been admitted from the 77th Infantry Regiment in Celle, and five others from the 37th Infantry Brigade in Munster. With one exception all these men had taken part as stretcher-bearers in the medical manœuvres held in Hanover from June 14th to 19th; this obviously suggested that the disease had been contracted while on these manœuvres. Positive Widal reactions having been obtained, telegraphic instructions were at once issued to the various garrisons in the army corps to isolate all men who had taken part in these manœuvres. Two other suspicious cases occurred in different garrisons, but no cases were reported from three regiments and one transport company which had also taken part in the manœuvres. Blood cultures having confirmed the diagnosis, special sanitary precautions were taken for the isolated *personnel*, *e.g.*, disinfection of latrines, special cooking arrangements, &c. One man, who had been on these manœuvres, and had already proceeded to Hanover for duty as a baker, when medically examined was found to have a rise of temperature to 103° F., although he did not at the time feel ill; bacteriological examination showed him to be suffering from typhoid fever.

Altogether twenty-two of the stretcher-bearers who had taken part in the manœuvres were attacked, and also seven others who had not been on manœuvres. One of the latter was evidently infected from an independent source, three others had been employed in attending typhoid cases; in the three remaining cases the infection can only be explained as a contact infection occurring before the onset of the fever. In another epidemic, Klinger showed that out of 812 cases infection must have occurred during the incubation period in at least 185.

Treatment.—Pyramidon in 7½-grain doses was found to reduce the temperature by 2½° to 3½° F., and to produce a general amelioration of symptoms. This drug was found to be quite as effectual as the cold bath treatment, and involved much less work for the hospital staff.

Source of Infection.—Allowing for an incubation period of fourteen to sixteen days, the infection must have taken place in the middle of June, and during the medical manœuvres. Patients in Celle reported that the water in a certain well which they had drunk on June 16th had a bad taste. Many of the patients, however, had not drunk any water from this well, and a number of men belonging to the transport company had drunk this particular water without showing any sign of typhoid fever. On careful examination no typhoid bacilli were found in this well water, and none of the inhabitants of the neighbourhood were found to be carriers. This was, therefore, evidently not the source of infection.

A spot plan of the barracks used by these men failed to throw any

light upon the subject. Latrines, water supply, and the possibility of contact infection from an ambulatory case were all excluded. The canteen *personnel* was examined but no carriers were found. The kitchen *personnel* was next examined. The blood of one of the employees, a woman whose duty it was to prepare vegetables, gave a positive Widal reaction in the dilution of 1 in 100. Repeated examinations of her evacuations resulted in the isolation of typical typhoid bacilli on two occasions in a fortnight. This woman was 61 years of age, and on enquiry stated that she had suffered from typhoid fever thirty-six years previously, but had not had any abdominal trouble or other illness since then. She had assisted in the preparation of a potato salad for the troops. Pfuhl has shown that the typhoid bacillus grows on the surface of potatoes in a fine, invisible layer, and in a warm kitchen can easily penetrate into the substance of the potato.

Bacteriological Examinations.—The stools and urine of all the stretcher-bearers who apparently remained healthy, as also of all men from the same barrack-rooms, were examined by culture for typhoid bacilli. Altogether 4,500 separate examinations were made. In all epidemics, experience has shown that in addition to the number of persons actually reporting themselves sick, there is always a number of mild ambulatory cases of fever, as well as bacilli carriers, who do not show any sign of disease. Thus Robert Koch found in South-west Germany, where only eight cases were reported, that there were in reality seventy-two definite infections by the typhoid bacillus. In the cholera epidemic in St. Petersburg, for every 100 cases there were twenty healthy carriers. Conradi and Scheller have brought to notice the occurrence of "primary carriers," *i.e.*, persons who have not developed any signs of fever but are found to excrete the bacilli after having been exposed to infection. The stools of all convalescents were examined on five separate occasions, at intervals of not more than six days.

The serum of all the stretcher-bearers was examined by the agglutination test. In addition to the twenty-two cases of typhoid fever, positive reactions in dilutions of 1 in 50 to 1 in 200 were obtained in fifty-nine other men. In two of these cases typhoid bacilli were found in the stools. Among the men who had inhabited the same barrack-rooms as the stretcher-bearers, thirty-nine out of 160 gave positive Widal reactions, and in one case bacilli were detected in the stools. Four of the thirty-nine developed typhoid fever. The total number of positive Widal reactions, which we must regard as typhoid infections, was 124, but clinically only twenty-seven developed typhoid fever. This shows how much more widespread the infection is than would appear from the number of patients admitted, and how necessary it is to isolate all men who have been exposed to infection, either at the original source or by contact with those who are in the incubation period of the disease. Positive Widal reactions are only rarely obtained among persons who have not been exposed to any infection.

All persons employed in kitchens of the 10th Army Corps must in future have their blood examined by the agglutination test as well as bacteriologically. Anyone with a positive Widal reaction, or who has suffered from typhoid fever, is not to be employed in the kitchen.

C. E. P.

Preservation of Surgical Instruments and Materials in the Tropics.—In the *Deutsche Militärärztliche Zeitung* of October 20th, 1909, there are some notes on this subject taken from the *Medizinalberichte über die deutschen Schutzgebiete*, 1907-1908. Surgical instruments with a cutting edge which are in frequent use can be preserved without loss of sharpness in glass or enamelled iron receptacles containing a 1½ per cent. watery solution of borax, with or without the addition of 2 per cent. of formalin. Carbolic acid should not be used as it causes red stains, which can only be removed with great difficulty. Borax solution is especially useful for hollow metal instruments. In some cases it may be more convenient to use the following varnish: shellac 15 parts, benzoin 13 parts, rectified spirits to 100 parts. This varnish should be thinly applied with a paint brush; it dries quickly and can easily be removed at any time with the aid of a little alcohol.

Silk web catheters should be sterilized by steam in "Kutner's" apparatus and then hung up in a glass catheter case containing dry calcium chloride. Gum elastic bougies are to be sterilised by boiling in a saturated solution of sulphate of ammonium. Soft rubber catheters, drainage tubes, &c., can be best preserved by keeping in the borax solution, which, however, is not suitable for any articles made of black rubber.

C. E. P.

Result of Examination of Recruits for French Army, 1909.—In the *Deutsche Militärärztliche Zeitschrift* of October 20th, 1909, there is a short note on the results of the examination of recruits for the French Army. There were 318,449 men liable for service. Of this number, 29,607 were found entirely unfit for military service. The main causes of rejection and approximate numbers under each of these were as follows: Poor physique, 4,500; tuberculosis, 5,000; diseases of the nervous system, 3,000; defects or diseases of the eye, 2,600; disease of the bones and organs of locomotion, 6,000.

During the last five years the numbers of rejections for poor physique and tuberculosis have almost quadrupled themselves.

C. E. P.

The Influence of Mental and Nervous Ailments on Military Service in Peace and War.—A lecture by Professor E. Meyer on this subject is reported in the *Deutsche Militärärztliche Zeitschrift* of August 20th, 1909. The lecturer notes the enormous increase in the number of cases treated in asylums during recent years. Thus in 1880, in the asylums of Prussia, there were 25,000 cases, while in 1900, the number had increased to 70,000; this increase is out of all proportion to the increase in the population.

The incidence of mental disease in the army from 1897 to 1902 averaged 0·92 per 1,000 of strength per annum. In 1874 to 1875 the admissions for mental diseases were 0·21 per 1,000, while in 1906 to 1907 the ratio had risen to 1·3.

The great majority of cases show signs of weak mental development dating from birth. The conditions of military life in peace soon led to a nervous breakdown, possibly taking the form of gross insubordination. In war time the strain and hardships cause an increase in the number of admissions for mental disease, most of which take the form of acute mental exhaustion.

C. E. P.

Prevention of Venereal Disease in the United States Navy.—In an article in the *Military Surgeon* for August, 1909, Assistant Surgeon Eytinge reports on the prophylaxis of venereal disease and its results on board the U.S.S. "Ranger."

The system adopted was as follows: (1) All liberty men returning must report at sick bay. (2) If they have been exposed to venereal disease, they must use the means provided. (3) If a man reports that has not exposed himself, his name is noted, and if he subsequently develops venereal disease, he is reported for disobeying orders.

The measures of prophylaxis were: (1) Before reporting the man is directed to wash well with water, and urinate. (2) In the sick bay he must then wash with the solution provided, namely, perchloride of mercury 1 in 2,000. (3) He then uses half a syringeful of the injection (3 per cent. protargol and 15 per cent. glycerine), and holds it in for three minutes. (4) Finally the ointment provided (30 per cent. calomel) i well rubbed in and left for two hours.

The results of these measures are reported to be an entire absence of venereal disease; although the ship visited some ten ports from Olongapo, *via* Singapore, Egypt, and the Mediterranean to the United States. U.S.S. "Concord" obtained the same results, although over 250 men reported themselves on return from liberty as having been exposed.

C. E. P.

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Original Communications.

AMAKEBE: A DISEASE OF CALVES IN UGANDA.[1]

BY COLONEL SIR DAVID BRUCE, C.B., F.R.S.,
CAPTAINS A. E. HAMERTON, D.S.O., AND H. R. BATEMAN,
Royal Army Medical Corps;
AND CAPTAIN F. P. MACKIE,
Indian Medical Service.
Sleeping Sickness Commission of the Royal Society, 1908-09.

[Plate 10.]

INTRODUCTORY.

AMAKEBE is the most important disease of cattle in Uganda. It attacks the calves soon after they are born, and destroys more than half of them. Among the native cattle the loss is reported to be as much as 75 per cent., but with careful nursing and hand-feeding this mortality may be reduced to between 20 and 30 per cent. This is an enormous toll to pay, and renders the breeding of cattle in Uganda for dairy purposes, or, indeed, for any purpose, very uphill work.

Little up to the present has been written as to the nature and causation of amakebe. It has been described as a trypanosome disease, but this evidently on insufficient knowledge.

DISTRIBUTION IN UGANDA.

Amakebe appears to occur all over the kingdoms of Uganda, Unyoro, Ankole, and Busoga. Lieutenant A. D. Fraser, R.A.M.C.,

[1] Reprinted from the *Proceedings of the Royal Society*, B, vol. 82.

the medical officer lately in charge of the Sleeping Sickness Camp, Sesse, reports, however, the curious fact that it does not occur among the cattle on the Sesse Islands. Mr. C. W. Hattersley also informs the Commission that cows brought to Mengo from Ankole invariably contract the disease, which would go to show that in some parts of Ankole the disease does not occur. Mr. R. J. Stordy, the chief veterinary officer, British East Africa, states that amakebe is found at every altitude in that Protectorate. Dr. A. Theiler, C.M.G., the chief veterinary bacteriologist, Transvaal, who lately visited Uganda, writes that Dr. Lichtenfeld, the principal veterinary officer, German East Africa, told him that a disease similar to amakebe exists in Ruanda, on the western shores of Victoria Nyanza and adjoining Ankole.

It is evident, then, that this disease is widely prevalent in Central Africa, and most disastrous in its effects.

Nomenclature.

In Uganda the disease is known as "kebe," "makebe," or "amakebe," and means calves' swollen glands, or mumps. At Ngora, to the west of Mount Elgon, the natives call the disease "angarwe"; in Unyoro, "masugu"; in Ankole, "amashuyu" or "amashui."

Symptoms.

The chief symptom of this disease is the swelling of the lymphatic glands, especially those in the region of the ear, in front of the shoulder, and in front of the hip. The glands frequently reach a large size, those in front of the shoulder often being 3 or 4 inches in length. They are soft to the touch, giving the impression of an elastic body under the skin. The hair is rough and staring, the head hangs, the ears droop, and there is frequently a watery discharge from the eyes and nose. During the illness the temperature runs high, often reaching 107° F. or more. The calf becomes rapidly emaciated, and often a dry, scabby eruption of the skin is seen. Diarrhœa is frequent, and the dung is often dark in colour, with an evil odour. The urine never shows any trace of blood, as in redwater.

The duration of the disease is usually about a fortnight, but sometimes the calves get over it in three or four days. The fever goes, they pick up condition, and the swelling of the glands subsides. The glands, however, never regain their normal size, but remain permanently enlarged throughout life.

When a calf has recovered from amakebe it is no longer susceptible to the disease. It is immune for the rest of its life.

The following cases illustrate the course of the disease :—

Experiment 1,387.—*To study Amakebe in the Calf.*

July 26th, 1909.—Animal received from Sir Apolo Kagwa, K.C.M.G., Kampala.

July 29th.—The prescapular glands are the size of a walnut. The calf looks fairly well, is thin, and hair slightly rough.

August 2nd.—The lymphatic glands are much more enlarged. The prescapular glands measure 3½ by 2 inches.

August 12th.—This calf is now looking very sick. Conjunctival mucous membrane congested. The hair is falling off in patches, leaving a rough, scabby surface. Diarrhœa.

August 14th.—Discharge from eyes and nose. Diarrhœa.

August 26th.—This calf got steadily worse, and died at 11.30 a.m. to-day.

The following chart represents the course of the temperature :—

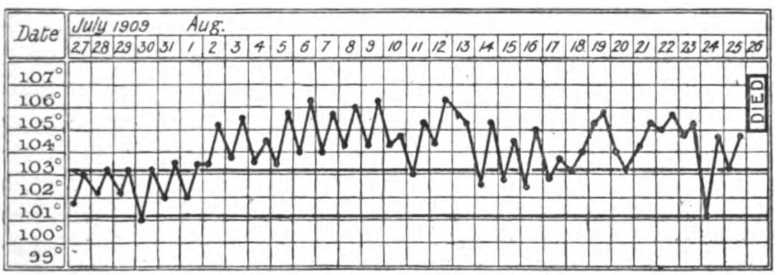

Chart 1.—Experiment 1,387. Temperature curve in a severe case of amakebe.

August 26th, 1901.—*Post mortem* immediately after death.

External Appearances.—The body is emaciated. Rigor mortis absent. The hair is staring and has a ragged appearance. There are many patches of eruption on the surface of the body, especially on the face and head. These eruptions are, as a rule, about the size of half-a-crown, and resemble limpet-shells.

Internal Appearances.—On removing the skin, the flesh is seen to be pale in colour. On opening into the abdomen the spleen is seen to be enlarged. The surface of the stomach and intestines is exceedingly pale and yellowish. There is no fluid in the peritoneal cavity. On opening into the thorax no fluid is found in either pleural cavity. There is about a tablespoonful of bright, chrome-coloured, clear fluid in the pericardium. The anterior

mediastinum contains a quantity of bright yellow, jelly-like material. The serous membranes are shining and smooth.

Lymphatic Glands.—The lumbar chain of glands are enlarged, some of them being the size of a small walnut. These enlarged glands, on being cut into, are found to be very œdematous, but not hæmorrhagic. The prescapular glands are much enlarged, being 8 cm. (3½ inches) in length.

Circulatory System.—Heart: The fat of the auriculo-ventricular groove is infiltrated with gelatinous material, which is bright yellow in colour. There are no petechiæ under the epicardium. On opening into the left ventricle many minute petechiæ are seen under the endocardium. The colour of the aorta is bright yellow. The substance of the heart is pale in colour and flabby to the touch. Weighs 125 grammes (4½ ounces).

Respiratory System.—Left lung is purplish in colour, with a dark purple patch in the anterior lobe about the size of half-a-crown. This, on being cut into, shows hæmorrhagic infarction. On section the left lung appears to be fairly healthy. Weighs 210 grammes (7½ ounces). *Right lung:* Anterior lobe and part of the middle lobe are purplish-red in colour and solid. The anterior lobe sinks in water. The surface is purplish-red in colour, and across the surface is a network of yellow-coloured, clear, jelly-like strands, resembling the lung in a case of horse-sickness. The strands in some places are ¼ inch wide. On section the substance is seen to be hepatised and dark purple in colour, and across the cut section the same network of yellow, gelatinous-like material is seen. The posterior lobe is pale in colour, and on section appears fairly normal. Weighs 345 grammes (12¼ ounces).

Alimentary System.—Spleen is enlarged, 29 cm. in length, 9 cm. broad, and 2·5 cm. in thickness (11 inches × 3½ inches × 1 inch). Capsule is purplish in colour. On section the tissue is dark purple in colour and friable. Weighs 245 grammes (8¾ ounces). *Liver* is bright yellow in colour, tinged with red, like bronze. Capsule is smooth. On section the substance is pale, with congested areas. *Gall-bladder* is distended with thick, greenish-yellow bile. Weighs 890 grammes (31½ ounces).

Fourth Stomach.—Is pale in colour. No ulceration. Intestines not examined.

Urinary System.—Left kidney: Capsule strips readily. On section the cortical part is seen to be pale, with dilated vessels. Weighs 102 grammes (3½ ounces). *Right kidney,* in a similar condition to the left. Weighs 95 grammes (3¼ ounces).

Experiment 1,634.—*To study Amakebe in the Calf.*

September 4th, 1909.—This calf was brought to Mpumu from Kome, one of the Sesse Islands, and was, therefore, susceptible to amakebe.

September 14th.—Sent into Kampala, in order to become infected.

September 24th.—Returned from Kampala.

October 4th.—Lymphatic glands much enlarged.

October 18th.—Died.

The following chart represents the course of the disease :—

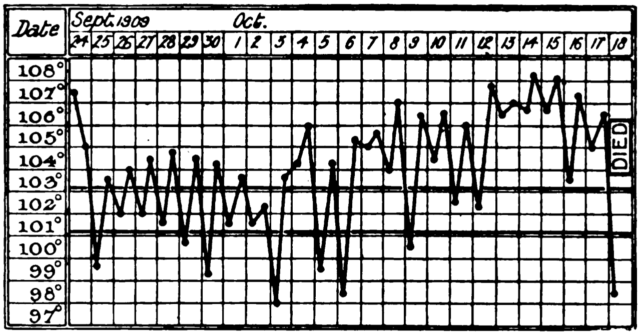

Chart 2.—Experiment 1,634. Temperature curve in a severe and fatal case of amakebe.

October 18th, 1909.—*Post mortem* immediately after death.

External Appearances.—Animal about 1 year old. Preauricular, prescapular, and precrural glands are much enlarged. The prescapular glands measure 3 inches in length and 1½ inches in breadth. On section the glandular tissue is œdematous and, in some places, hæmorrhagic.

Internal Appearances.—On opening into the peritoneal cavity about a gallon of clear, amber-coloured fluid is found. There is a large quantity of yellow, gelatinous infiltration into the omentum. The serous membrane of the omentum is markedly hæmorrhagic, being covered with small petechiæ. The small intestine is dark crimson in colour and intensely congested. The whole of the peritoneal aspect of the diaphragm is covered with small hæmorrhages. On removing the sternum a quantity of yellow, gelatinous material is found in the mediastinum. About 2 ounces of the same clear, amber-coloured fluid are seen in the pleural cavity. The pericardium contains a small quantity of clear, straw-coloured serum.

Circulatory System.—*Heart:* A quantity of yellow, gelatinous

material is seen at the base. Many small petechiæ both inside and outside the heart.

Respiratory System.—A quantity of white frothy fluid exuded from the nose during the last hours of life. On opening into the *trachea*, however, it is now found to be empty. The *left lung* is partially collapsed and dark purple in colour. On section the organ is dark crimson in colour and intensely congested. It is, in places, solid in consistence, and a portion placed in water sinks. On pressure a white, frothy fluid exudes. *Right lung* is pale in colour, and there are numerous hæmorrhages into the serous membrane. On section it is found to be congested. No part of the lung sinks in water.

Alimentary System.—*Spleen* is enlarged. Measures 14 inches in length and 4½ inches in breadth. Numerous petechiæ into the capsule. On section the substance is dark in colour, soft, and friable. Weighs 480 grammes (17 ounces). *Liver* is enlarged. On section is seen to be congested. Gall-bladder is distended with dark, olive-green-coloured bile. Weighs 3 lb. 10 ounces.

Fourth Stomach.—Is reddened, and there are numerous small ulcers in the serous membrane.

Urinary System.—*Right kidney:* Capsule strips readily. There are numerous petechiæ into the capsule. Surface of the organ is injected. On section the kidney is seen to be congested, with many hæmorrhages into the substance. *Left kidney* is in a similar condition to the right.

Experiment 1,636.—*To study Amakebe in the Calf.*

September 4th, 1909.—From Kome. Same history as Experiment 1,634. Great enlargement of lymphatic glands. October 12th. —Died.

The following chart represents the course of the disease:—

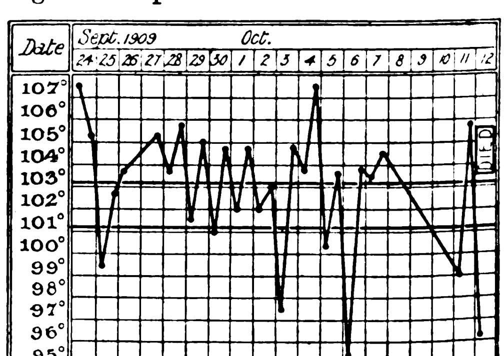

CHART 3.—Experiment 1,636. Temperature curve in a severe and fatal case of amakebe.

October 12th, 1909.—*Post-mortem* two hours after death.

External Appearances.—This calf has had a running from the nose of clear fluid, which has made a small pool under its head, and at death there was a marked collection of white foam at the nose, like that which occurs in horse-sickness, but not to such an extent.

Internal Appearances.—On removing the skin and opening into the peritoneum, about 4 ounces of clear, straw-coloured fluid is found. The omentum is infiltrated with a yellow, jelly-like material. On opening into the thorax, 2 ounces of clear, straw-coloured fluid is seen in the pericardium. About 4 ounces of the same straw-coloured fluid in both pleural cavities. On removing the tongue and trachea a large quantity of jelly-like material is found under the trachea.

Lymphatic Glands.—The prescapular glands are enlarged. One measures 4½ inches in length and 1 inch in thickness. On section it is seen to be dark crimson in colour and hæmorrhagic. The glands generally are enlarged and hæmorrhagic. Some of them show signs of breaking down into pus.

Circulatory System.—Heart: A large quantity of yellow, jelly-like material at the base is seen. There are numerous small petechiæ into the epicardium. None in the endocardium. Muscular substance is pale. Weighs 1 lb. 5 ounces.

Respiratory System.—Tongue normal. The *trachea* is full of white froth. Glands at the bifurcation of the trachea are much enlarged and hæmorrhagic. *Right lung:* Anterior lobe is dark purple in colour and is found to be the seat of a large infarct. Posterior lobe is also the seat of an infarct at the margin, about 3 by 2 inches in extent. On section the substance of the lung is extremely œdematous. A large amount of frothy fluid exudes on pressure. Weighs 2 lb. 10 ounces. *Left lung* is also the seat of numerous infarcts. On section a large amount of frothy fluid exudes on pressure. Weighs 1 lb. 6 ounces.

Alimentary System.—Spleen measures 13 inches in length and 4 inches in breadth. On section the substance is soft and friable. Weighs 13 ounces. *Liver* is enlarged. It is full of flukes. The gall-bladder is distended with dark, chocolate-coloured bile, which contains many flukes. Weighs 8 lb. 5 ounces.

Fourth Stomach.—The mucous membrane of the fourth stomach is congested. It is dark crimson in colour, and numerous small ulcers are seen scattered throughout.

Urinary System.—Right kidney: Capsule strips readily.

Under the capsule numerous infarcts are seen, about the size of a pea. On section the substance of the organ is congested. Weighs 8 ounces. *Left kidney:* Capsule strips readily. In the pelvis of the organ there is a quantity of yellow, jelly-like material. Under the capsule there are also several small infarcts. One of these is as large as a small marble. On section the substance of the kidney is seen to be congested. Weighs 5 ounces.

Experiment 1,386.—*To study Amakebe in the Calf.*

July 26th, 1909.—Received from Sir Apolo Kagwa. Had also been kraaled at Kampala for some days.

August 27th.—The course of the disease was much the same as in Experiment 1,387. The prescapular and other glands became much enlarged, one of them measuring 4 inches in length. By this date the calf had recovered, and was returned to owner.

The following chart represents the course of the temperature:—

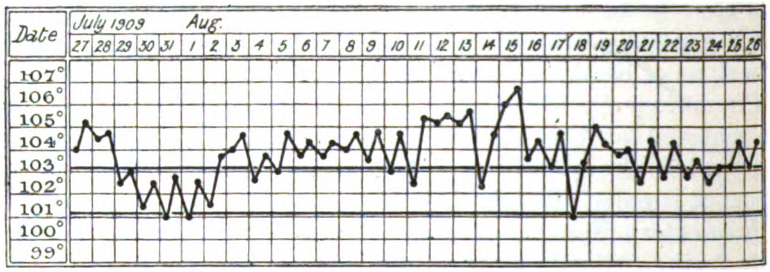

CHART 4.—Experiment 1,386. Temperature curve in a case of amakebe ending in recovery.

Experiment 1,635.—*To study Amakebe in the Calf.*

The following chart represents the course of the temperature:—

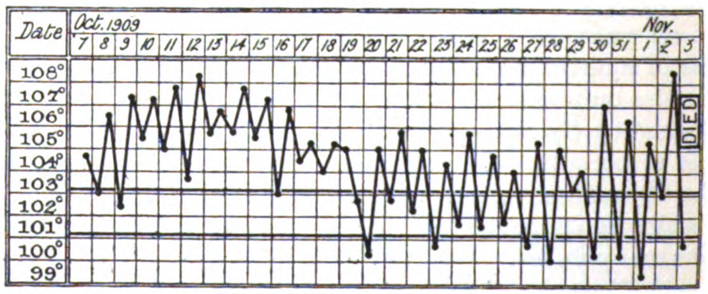

CHART 5.—Experiment 1,635. Temperature curve in a case of amakebe ending fatally.

From these foregoing cases and the *post-mortem* examinations, it will be seen that amakebe is an acute disease of calves, and that

the main features of the *post mortem* are signs of intense anæmia, petechiæ of serous membranes, infiltration of jelly-like material into omentum, anterior mediastinum, base of heart, &c., œdema of lungs, swelling, and softening of spleen, hæmorrhagic infarcts into lungs, spleen, and kidneys, and sometimes ulceration of the mucous membrane of the stomach.

Piroplasms usually found in the Blood of Uganda Cattle.

When the blood of cattle in Uganda is examined microscopically, two parasites are always to be found, though usually in very small numbers. One of these can readily be recognised as *Piroplasma bigeminum* from its large size and the characteristic appearance of the two pear-shaped bodies (Plate 10, fig. 1). It may, however, also appear as irregularly shaped, amœboid forms, especially in the spleen (Plate 10, fig. 1). The other parasite is much smaller in size, and is usually seen in the form of a small rod or ring (Plate 10, fig. 2). Both these parasites are inoculable, and appear in the blood of calves without giving rise to any marked disturbance.

Have either of them any connection with amakebe? The following experiments go to show that they have not.

Experiment 556.—*To ascertain the effect on a Susceptible Calf of the Injection of Blood containing the Small Rod, and Ring-shaped Piroplasm. Will it give rise to Amakebe?*

February 22nd, 1909.—This calf was born last night. To-day the mother was cleared of ticks by hand-picking, and then completely smeared with a mixture of paraffin and cyllin, and mother and calf then placed in a tick-free enclosure.

February 26th.—Injected this calf with 5 cc. blood from calf, Experiment 430, whose blood contains the small rod and ring-shaped piroplasm.

The chart on p. 476 gives the result.

Remarks.—Twenty-four days after the injection of the blood containing the small piroplasm, the same rod and ring forms appeared in the blood. The temperature curve hardly shows any response to the invasion of the parasite, and the calf shows no signs of illness. It is evident, then, that the injection of blood containing this small piroplasm gives rise to no symptoms like those seen in amakebe.

In the same way the injection of blood containing *P. bigeminum* is followed, after some days, by the appearance of this parasite.

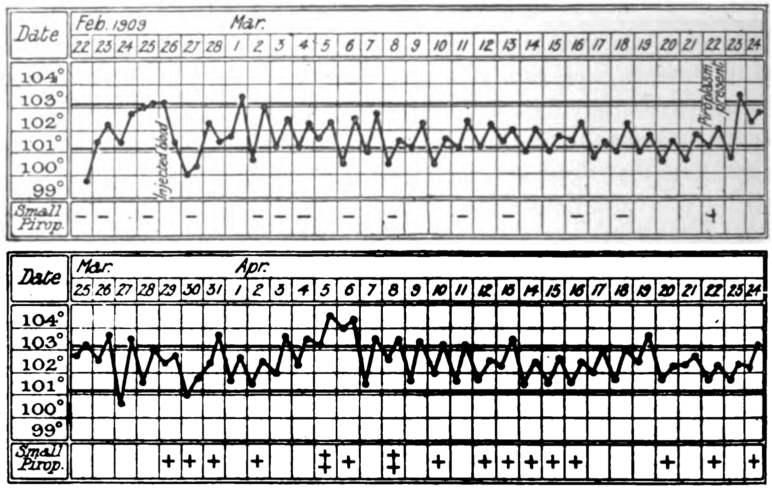

CHART 6.—Experiment 556 represents the temperature curve of a calf which has been injected with blood containing the small rod- and ring-shaped piroplasm. The *minus* and *plus* signs show the absence or presence of the small rod- and ring-shaped piroplasm in the blood.

Experiment 1,901.—*To ascertain if the Injection of Blood containing* Piroplasma bigeminum *will give rise to Symptoms of Amakebe.*

August 20th, 1909.—Injected 2 cc. blood containing *P. bigeminum* into this calf.

The following chart gives the temperature curve:—

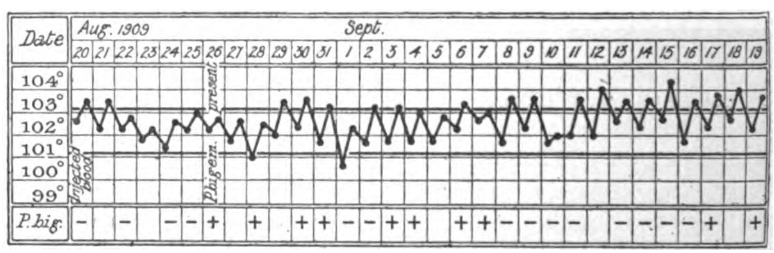

CHART 7.—Experiment 1,901 represents the temperature curve of a calf which has been injected with blood containing *P. bigeminum*. The *plus* and *minus* signs show the presence or absence of *P. bigeminum* in the blood.

Remarks.—Six days after the injection of blood containing the *P. bigeminum*, this parasite appeared in the blood. The temperature curve is not affected, nor does the calf appear ill. It may therefore

be concluded that amakebe is not caused by the injection of blood containing either *P. bigeminum* or the small rod and ring form.

It is well known that *P. bigeminum* is carried from affected to susceptible animals by different varieties of the blue tick, as well as other species of ticks. It would seem that the small rod and ring form of piroplasm is carried by the brown tick, as the following two experiments will show:—

Experiment 747.—*To ascertain if Brown Nymphs which had fed as Larvæ on an Animal whose Blood contained the Small Rod and Ring Forms, are capable of carrying them to a Susceptible Animal, and if the Disease so set up will have the Symptoms of Amakebe.*

June 24th, 1909.—This calf, like the others, has been brought up in a tick-free shed. It has been under observation since May 10th without showing any small rod and ring forms in its blood. To-day a large number of brown nymphs, which had fed as larvæ on an ox whose blood contained the small rod and ring piroplasm, were placed on this calf.

The following chart shows the course of the temperature :—

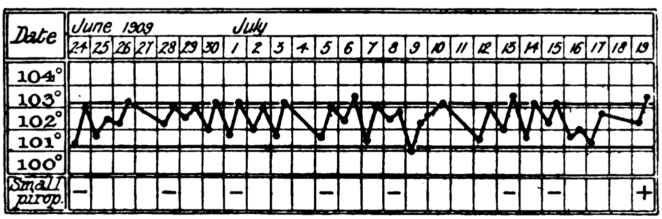

CHART 8.—Experiment 747 represents the temperature curve of a calf upon which infected brown nymphs have been fed. The *minus* and *plus* signs show the absence or presence of the small rod and ring piroplasm in the blood.

Remarks.—Twenty-five days after the infected brown nymphs were fed on this calf the small rod- and ring-shaped piroplasm appeared in the blood. The temperature curve is not affected, and the calf shows no signs of amakebe. It is evident, then, that the small rod- and ring-shaped piroplasms transferred to a susceptible calf by means of brown nymphs do not give rise to amakebe.

Experiment 659.—*To ascertain if Adult Brown Ticks which had fed as Nymphs on an Animal whose Blood contained the Small Rod and Ring Forms, are capable of carrying them to a Susceptible Animal and setting up the Symptoms of Amakebe.*

August 23rd, 1909.—This calf was born on April 4th in a tick-free shed. It has been examined almost daily since that date, and up to the present has shown no parasites of any kind in its blood. To-day a large number of adult brown ticks were placed on this calf.

The following chart shows the course of the temperature:—

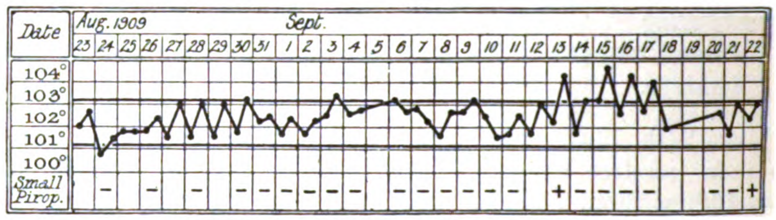

CHART 9.—Experiment 659 represents the temperature curve of a calf upon which infected brown adult ticks had been fed. The *minus* and *plus* signs show the absence or presence of the small rod and ring piroplasm in the blood.

Remarks.—Twenty-one days after the infected brown adults had fed on this calf the small piroplasm appeared in the blood. The temperature curve is only slightly affected, and the calf shows no symptoms of amakebe.

From the foregoing experiments it may be concluded, then, that the appearance of *P. bigeminum*, or of the small rod and ring form of piroplasm in the blood of a susceptible calf, whether introduced by the injection of blood, or, in the case of the latter, by the agency of the brown tick, is not accompanied by the symptoms of amakebe. It also is seen from these experiments that the small rod and ring form is inoculable, is carried by the brown tick, and the incubation period is long. This corresponds with the description given by Dr. Theiler, Pretoria, of the piroplasm discovered by him in the Transvaal, and named by him *P. mutans*.

We may therefore consider that the two piroplasms which constantly occur in the blood of Uganda cattle are those known as *Piroplasma bigeminum* and *Piroplasma mutans*, and that neither is the cause of amakebe.

Is Amakebe Incurable?

It has been shown that blood containing either *P. bigeminum* or *P. mutans*, if injected into susceptible cattle, will give rise to

these diseases. Is it equally true that amakebe is inoculable? The following experiments were carried out to obtain an answer to this question:—

Experiment 1,902.—*To ascertain if Blood taken from an Animal suffering from Amakebe, and injected into a Susceptible Calf, will give rise to the Disease.*

February 22nd, 1909.—This calf was born last night. Placed in tick-free shed.

February 26th.—Injected with 5 cc. blood from calf, Experiment 430, suffering from amakebe.

The following chart shows the result:—

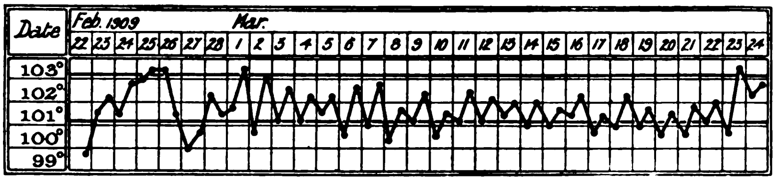

CHART 10.—Experiment 1,902 represents the temperature curve of a calf into which blood from a case of amakebe has been injected.

Remarks.—The temperature curve is not disturbed by the injection of amakebe blood, nor is the calf affected in any way.

Experiment 1,903—(*The above experiment repeated.*)

August 20th, 1909.—Injected 5 cc. mixture of blood and gland-juice from calf, Experiment 1,387, which is suffering from amakebe.

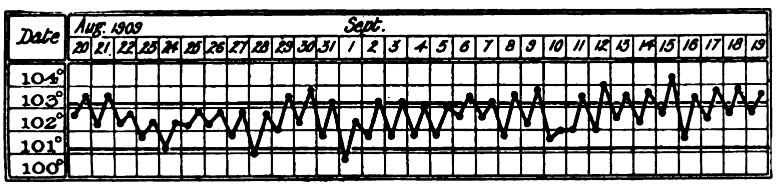

CHART 11.—Experiment 1,903 represents the temperature curve of a calf into which blood from a case of amakebe has been injected.

Remarks.—The result of the injection of amakebe blood is again negative.

Experiment 1,904.—(*The above experiment again repeated.*)

August 21st, 1909.—Injected amakebe blood.

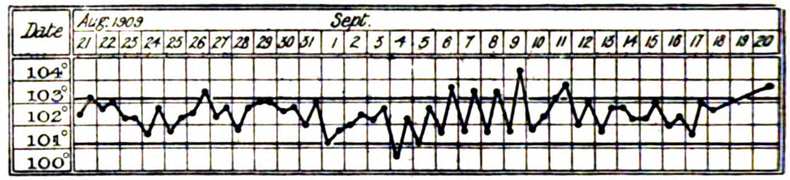

CHART 12.—Experiment 1,904 represents the temperature curve of a calf into which blood from a case of amakebe has been injected.

Remarks.—Result negative.

Experiment 1,905.

September 24th, 1909.—Injected amakebe blood.

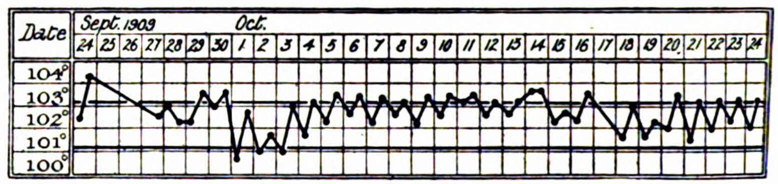

CHART 13.—Experiment 1,905 represents the temperature curve of a calf into which blood from a case of amakebe has been injected.

Remarks.—Result negative.

On three other occasions (Experiments 659, 1,585 and 1,586) was this experiment repeated, and always with a negative result.

It may be concluded, then, that amakebe differs from *P. bigeminum* and *P. mutans*, in that it is not inoculable, whereas the latter diseases are.

RESULT OF EXPOSING SUSCEPTIBLE CALVES IN A KRAAL CONTAMINATED BY AMAKEBE.

Kampala, the native capital of Uganda, has a bad reputation for amakebe. This is probably due to the number of calves stabled in the vicinity. Kampala has a large population of both Europeans and natives, and the milk supply is obtained from private cows kept in the town. The herds of cattle belonging to different individuals are grazed in various parts of the country, but as soon as a cow has calved, she is sent into Kampala to provide milk for her owner. Almost all the calves brought in die of amakebe, which brings about an unhealthy state of things in the cattle kraals where the calves are kept during the day.

The following experiments will show the effect of exposing susceptible calves for a few days in a Kampala cattle kraal:—

Experiment 1,590.—*To ascertain the Effect of exposing a Susceptible Calf in a Kraal contaminated by Amakebe.*

October 11th, 1909.—Sent this calf into Kampala. October 17th.—Returned from Kampala.

The following chart shows the course of the temperature, and the presence or absence of *P. bigeminum* or the small rod- and ring-formed piroplasma in the blood.

Remarks.—The result of exposing this calf to a contaminated kraal is an attack of amakebe, characterised by high fever, swollen glands, and death.

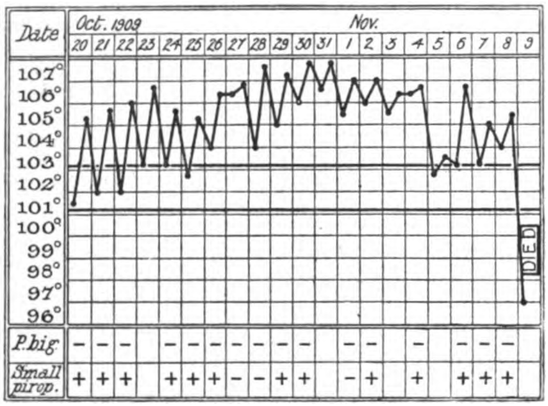

Chart 14.—Experiment 1,590 represents the temperature curve of a calf which has been exposed in a kraal contaminated by amakebe. The *plus* and *minus* signs show the presence or absence of *P. bigeminum* or the small rod and ring piroplasm in the blood.

Experiment 1,593.—*To ascertain the Effect of exposing a Susceptible Calf, as in the previous Experiment.*

October 11th, 1909.—This calf sent into Kampala. October 17th. —Returned from Kampala.

The chart on page 482 represents the course of the disease, and the presence or absence of *P. bigeminum* or the small piroplasm in the blood:—

It is evident, then, that the exposure of susceptible calves for a few days in a kraal where amakebe is common is followed by a serious illness. There is high fever, glandular enlargement, emaciation, and, as a rule, death. This disease has been shown to

be caused neither by *P. bigeminum* nor *P. mutans*. What, then, is it caused by?

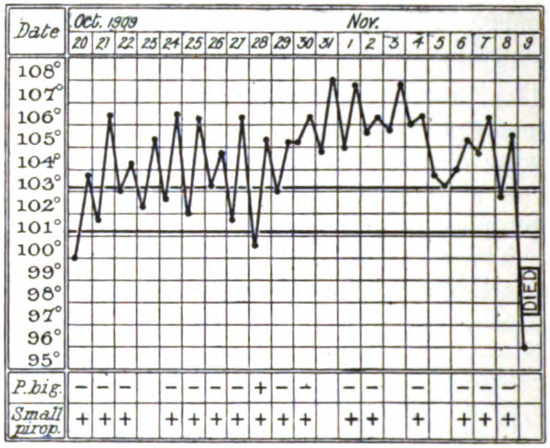

CHART 15.—Experiment 1,593 represents the temperature curve of a calf which has been exposed in a kraal contaminated by amakebe. The *plus* and *minus* signs show the presence or absence of *P. bigeminum* and the small rod and ring piroplasm in the blood.

EXAMINATION OF THE BLOOD IN AMAKEBE.

When the blood of an animal suffering from amakebe is examined, many small piroplasms will be seen (Plate 10, fig. 3), which appear to be of the same size and shape as *P. mutans*, and sometimes a few *P. bigeminum*; otherwise, no new parasite can be said to have come into the blood. This increase in the number of the small piroplasms in the blood of a calf suffering from amakebe may be explained by saying that the severe illness has led to an excessive multiplication of the *P. mutans* which was already in the blood. Or, on the other hand, it may be that another species of piroplasm, similar in size and shape to *P. mutans*, has appeared in the blood, and that the phenomena of amakebe are due to it.

Marginal Points.—Besides the large and small piroplasms, another kind of body is found in the red blood corpuscles, which Theiler has called *marginal points*. In a lecture delivered by him in August, 1909, at Nairobi, in British East Africa, and published in the *Agricultural Journal of British East Africa*, October, 1909, he states: "I have recently come to the conclusion that the disease called gall-sickness, and hitherto looked on as a sequel of redwater,

is due to the presence of another parasite, which I have called 'Marginal Points,' owing to their position in the red blood corpuscles. Gall-sickness is, therefore, a separate and distinct disease." Dr. Theiler considers it proved that this new disease is transmitted by the blue tick. This all shows how complicated and difficult to distinguish are the diseases of cattle. An ox may have *P. bigeminum*, small rod- and ring-shaped piroplasms, marginal points, and one or two species of trypanosome in its blood at the same time. To which parasite have the different phenomena of the disease to be credited?

The two following tables give the blood examination in two cases of amakebe, and illustrate this complexity:—

EXPERIMENT 1,387.—BLOOD EXAMINATION IN A CASE OF AMAKEBE.

Date	Parasites in Blood			Number of red blood corpuscles in 1 cc.m. of blood. Normal 10,000,000
	Piropiasma bigeminum	Small rod and ring forms	Marginal points	
1909				
July 28	−	−	+	
,, 29	−	+	−	
,, 30	−	−	+	
,, 31	−	−	+	
Aug. 1	−	−	−	
,, 2	−	−	+ +	5,420,000
,, 3	−	+	+ +	5,670,000
,, 4	−	+	−	
,, 5	−	−	+	
,, 6	−	+	+ +	5,680,000
,, 7	−	+	+ +	
,, 8	−	+	+	
,, 9	−	+	+	
,, 10	−	−	+	
,, 11	−	−	+ +	4,420,000
,, 13	−	+	+ + +	
,, 14	−	+	+ + +	
,, 16	−	−	+ + +	4,540,000
,, 19	−	+	+ + +	4,500,000
,, 23				2,890,000
,, 24	+ + +	+	+	2,820,000

TABLE I., EXPERIMENT 1,387.—The parasites to be found in a case of amakebe. The *plus* and *minus* signs show the presence or absence of these bodies in the blood. The fourth column gives the number of red blood corpuscles in a cubic millimetre. + present; + + numerous; + + + very numerous.

EXPERIMENT 1,636.—BLOOD EXAMINTION IN A CASE OF AMAKEBE.

Date	Parasites in Blood			
	Piroplasma bigeminum	Small rod and ring forms	Marginal points	*Trypanosoma vivax*
1909				
Sept. 24..	–	–	–	–
,, 27..	+	+	+	–
,, 28..	–	+	–	–
,, 29..	–	–	–	–
,, 30..	–	–	–	–
Oct. 1	–	–	–	+
,, 2	+	+	–	–
,, 4	–	–	–	–
,, 5	–	+	–	–
,, 6	–	+ +	–	–
,, 7	–	+	+	–
,, 8	–	+	–	+
,, 9	–	+	+	+
,, 11	+	+	+	+
,, 12	+	+	+	+

TABLE II., EXPERIMENT 1636.—Parasites found in a case of amakebe. The *plus* and *minus* signs show the presence or absence of these bodies in the blood.

Remarks.—From these two tables it will be seen that small piroplasms and marginal points are commonly found in amakebe, and that trypanosomes may also be present.

The marginal points are small, deeply staining bodies, usually placed near the edge of a red blood corpuscle (Plate 10, fig. 3). If these bodies really constitute a new and undescribed parasite, the discovery will be one of the greatest interest. Bodies similar in every way to these are found, however, in healthy young rats, goats, calves, &c., so that it is difficult to believe at once in their parasitic nature. Rather would they appear to be cell enclosures, due to rapid changes taking place in the blood, such as take place in young animals or in anæmias. In amakebe they are sometimes very numerous, and it requires no great stretch of the imagination to see in them the youngest stage of the intra-corpuscular parasite, which from being round becomes wedge-shaped, oval or circular and rod-shaped. It may be that both these views are true—that some of the so-called marginal points are remains of chromatin from some previous nuclear structure, and that others are the earliest stages of an intra-corpuscular parasite. More work is required before any definite conclusion can be arrived at.

Koch's Granules or Blue Bodies.—Another body which may sometimes, though rarely, be seen in the blood of amakebe calves, is one similar to that first described by Koch, and known as Koch's

Granules or Blue Bodies. They are found principally in the spleen, lymphatic glands and liver, where they may be quite numerous. Stained by Giemsa the body appears as a blue-coloured cell, filled with coarse chromatin granules (Plate 10, fig. 5).

The following table gives cases of amakebe in which these bodies were found :—

Experiment	Date	Spleen	Liver	Lymphatic glands	Kidney	Lung	Blood
	1909						
415	May 10	+					
1,392	July 24	+					
1,593	Nov. 10	+					
1,633	Oct. 5	+ + +	+ + +	+ + +			
1,634	,, 18	+ +	+ +	+	+	+	
1,635	,, 15						+
1,636	,, 12	+	+	+	+	+	
1,637	,, 6	+	+	+	+	+	
1,638	,, 6	+ +	+	+ +	+	+	+
1,833	—	+	+		+		
1,888	Nov. 5	+ +					
1,891	,, 8	+					
1,908	,, 14	+ +					

Table III., showing the presence of blue bodies in cases of amakebe. + present + + numerous; + + + very numerous; – absent.

Diagnosis of Amakebe.

What, then, is amakebe? In the opinion of the Commission it is the disease of cattle discovered by Koch, and named by him East Coast fever. The chief grounds for this opinion are, the symptoms during life, the appearances after death, the occurrence of a small piroplasm in the blood indistinguishable from *Piroplasma parvum*, and lastly and chiefly, the presence of the blue bodies in the spleen and other organs. These bodies have never been known to occur in any other disease, and the diagnosis of East Coast fever is made in South Africa if such bodies are found in spleen smears.

Conclusions.

(1) The blood of cattle in Uganda almost always contains *P. bigeminum* and *P. mutans*, and the cattle are therefore immune to these two diseases.

(2) The disease of calves called amakebe is East Coast fever, so that very many of the cattle in Uganda are almost immune to this disease.

(3) Owing to the nature of East Coast fever, inasmuch as animals recovered from the disease are no longer infective, some calves may escape attack of amakebe, and so remain susceptible.

(4) Thus the calves of the Sesse Islands escape amakebe, and when as grown-up cattle they are transferred to the mainland, they mostly die of East Coast fever.

(5) The carriers of East Coast fever—*Rhipicephalus appendiculatus*, or brown tick; *R. evertsi*, or red-legged tick; and *R. simus*—are all common in Uganda.

DESCRIPTION OF PLATE.

Fig. 1.—The two upper corpuscles show the characteristic pear-shaped forms of *Piroplasma bigeminum* as they appear in the blood. The lower amœboid forms are drawn from a preparation of spleen. Stained Giemsa. × 2,000.

Fig. 2.—*Piroplasma mutans* in the blood. Stained Giemsa. × 2,000.

Fig. 3.—The small rod- and ring-shaped piroplasm, as seen in the blood of a case of amakebe. Among them are the deeply stained bodies known as marginal points. Stained Leishman. × 2,000.

Fig. 4.—Red blood corpuscles containing piroplasms from the spleen of a case of amakebe. Stained Giemsa. × 2,000.

Fig. 5.—Koch's granules or blue bodies from the spleen of a case of amakebe. Stained Giemsa. × 2,000.

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

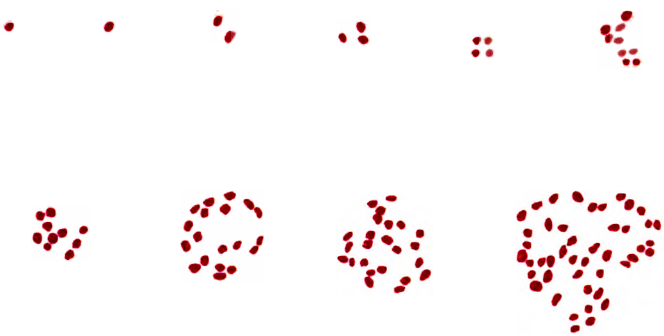

Fig. 5.

Bale & Danielsson, L^td lith.

MEDICAL HISTORY OF THE SOUTH AFRICAN WAR.

By Lieutenant-Colonel R. J. S. SIMPSON, C.M.G.
Royal Army Medical Corps.

(*Continued from p.* 271.)

E.—The Development on the Western Line.

The heading of this section is perhaps misleading. Epidemic disease was prevalent to a considerable extent on the Western line —*i.e.*, the line from De Aar to Kimberley—but the chief interest of this prevalence lies in that it was in all probability the precursor of the far more important epidemic in Bloemfontein, and possibly even of that in Kroonstadt. Hence, the story, beginning on the Western line, will be carried on to include the Bloemfontein outbreak.

(i.) *The Military History of the Area concerned* may be summarised as follows: from the beginning of the war, De Aar and Orange River were occupied by small bodies of troops. Lord Methuen's force concentrated at Orange River in the week preceding November 20th; the advance to Kimberley began on the 22nd; the battles of Belmont, Enslin, and Modder River took place on November 23rd, 25th, and 28th respectively. From that date till the battle of Magersfontein, December 11th, and after that date, Lord Methuen remained in intrenched camp at Modder river. During December the number of troops on the line between De Aar and Modder River was largely increased. Then followed (between January 28th and February 12th) the concentration of troops for the advance at various stations on the line south of Modder River. From February 11th to 13th various bodies of troops advanced into the Free State. Paardeberg was invested on February 17th, and operations continued there till the 27th. The main army, under Lord Roberts, concentrated at Osfontein on March 6th, and the advance to Bloemfontein began the following day.

Our weekly returns cut the period at March 9th, the date of the last return before Bloemfontein was reached, which fits in conveniently with the final division of the troops of the advancing force from those on the Western line. During the operations in the Free State, prior to the advance from Osfontein, sick were sent to the hospitals on the Western line from the field hospitals with the advancing force, but this ceased with the departure from

Osfontein. Hence, up to that date, some of the sickness was recorded on the Western line, and not with the main army.

(ii.) *Approximate Strengths* :—

At De Aar and Orange River on	13.10.99	2,200	App. 7, R.W.C.
,, Belmont	23.11.99	9,666	Offic. Hist., i., App. 6.
,, Modder River	28.11.99	10,066	,, ,, ,,
,, Magersfontein	11.12.99	14,459	,, ,, ,,
On the L. of C. (additional to Lord Methuen)	20.12.99	11,000	*Times* Hist., iii., p. 110.
Detrained	28.1.00—11.2.00	30,000	Offic. Hist.
Including 1st Division (not including L. of C.)	16.2.00	41,000	,, p. 337.
Main Army	6.3.00	32,297	Offic. Hist., ii., p. 190.
,, at Bloemfontein	13.3.00	32,549	,, ii., App. 6.
Advance to Pretoria	3.5.00	..	..
Main Army		23,732 } 41,663	,, iii., App. 2.
Two columns		17,931 }	

It is impossible to ascertain the average monthly strengths for the period, but from the figures given above we may form some rough idea, as given below, of the average total strength of the troops sending their sick to the Western line :—

October	1,300	December	20,000	February	over 50,000
November	2,000	January	25,000		

It is most important to note that in the main army which left the Western line for Bloemfontein, the Guards Brigade had been exposed to infection since the first appearance of disease; the whole of the 19th Brigade and three-fourths of the 18th had been exposed on the Western line since the middle of December—that is, during the development of the outbreak—so that over 10,000 men, or rather less than a third of the main army, had been exposed to prolonged infection before entering the Free State.

(iii.) *The Composition of the Units.*—Most contained a large proportion of Reservists, ranging from 40 per cent. in the 6th Division to 52 per cent. in the 7th. The force under Lord Roberts contained at least 3,000 of South African and Oversea Colonials, so that it was, on the whole, well seasoned with "salted" men. The 7th Division arrived in South Africa between January 23rd and February 3rd, and went direct to the Western line :—

(iv.) *General Hygienic Conditions* :—

(*a*) *The Topographical and Climatic Conditions* were not favourable. Unlike Natal, the general characters of the area are those of an arid, treeless plain, broken by kopjies and dongas, very dusty, and reflecting all the incident heat. Over the whole of this area the mean maximum and wet bulb temperatures are relatively

high, even in South Africa; the heat and dust were excessive during the advance, and especially during the earlier operations in the Free State. During the whole period there were frequent thunder-storms accompanied by torrential rain, from which the men (during the operations in the Free State at least), in bivouacs, and at times with only their great-coats, suffered severely.

(*b*) *Food Supplies.*—After the loss of the convoy at Waterval Drift on February 15th, the men received only half rations of groceries and bread till March 1st; from this date three-quarter rations. Meat was always plentiful, and an extra quantity was issued with the idea of compensating for the deficiency in the other items. But from supply difficulties and the nature of the earlier operations in the Free State, it then happened that bodies of men remained without food for comparatively long intervals. The difficulty of procuring firewood, too, complicated this question. In Bloemfontein there was a considerable shortage of food till April 7th, and to a less degree till April 17th.

(*c*) *Water Supply.*—This was usually bad, though some was better than others. Lord Methuen's force, and, indeed, a large proportion of the troops on the line or concentrated on it temporarily, depended mainly on the water of the Modder and Riet Rivers, which was thick, muddy, and liable to contamination. The fine, slimy mud clogged the filters which some units had, and at the best rendered their output small and slow, while often they could not be used at all. Treatment with alum resulted in some slight improvement, and boiling was also used as a means of purification, but to a limited extent from the want of fuel. At Modder River, a few shallow wells, sunk about 30 feet from the river bank, gave water that was a little better than that taken direct from the river.

On the line away from the rivers the quantity was limited; the source was from wells. During February nine boreholes were put down between Orange and Modder River by the Cape Government for the military authorities. Of these, five were successful: one gave 6,000, one 8,000, and three 11,500 gallons per diem, sufficient for small bodies of troops. The other four were abandoned at comparatively small depths, owing to the presence of hard rock. These bores were used for the troops on the line and during the concentration. The water was good.

But water difficulties really became serious on the advance into the Free State. The supply was scanty, so much so that the line of advance was to some extent determined by the channels of the

Riet and Modder Rivers. There was a spring at Osfontein of limited output, otherwise the supply was from dams. When possible, the Royal Engineers went forward and laid down a length of hose and a hand pump, but the water was naturally foul, and deteriorated by the watering of horses and transport animals rendered uncontrollable by thirst. So long as the army was in touch with the rivers the supply was drawn from them, and notably at Paardeberg, where one section of the force drew its water from the river below the Boer laager, where it was almost certainly highly contaminated.

Bloemfontein before our occupation had a double supply; one, incomplete and not compulsory, from the water-works at Sanna's post (some 21 miles east of the town), where water was taken from the Modder, pumped through two reservoirs, one of which was provided with a sort of filtering arrangement, and distributed to the town in pipes. The process of purification was inefficient, but the supply, on the whole, was probably better than the alternative, that from wells in and around the town. On our arrival the water supply had been cut off,[1] but the water-works were occupied by us immediately after. On April 3rd the supply was again cut off by the Boers, and it was not till May 10th that the supply to the town was resumed. On April 16th a borehole at Sussex Hill was completed, giving 12,000 gallons per diem, and supplying the troops stationed there. By April 27th a bore at the Willow Trees was completed, with a daily yield of 96,000 gallons. This supply was forced into the town mains, and distributed to various camps. Three old bores in the same neighbourhood were cleared out and enlarged between May 8th and 28th, giving a total daily yield of 61,000 gallons; these supplied the hospitals and camp close to them. On May 27th a bore, giving 8400 gallons, was opened in the camp of the 9th Division. Beyond the radius within which these various boreholes were practically accessible by water-carts and otherwise, the old, shallow, and, generally speaking, badly-protected wells were in use.

It will be seen, then, that no general statement can be made regarding the water supply of the whole of the troops for the whole of the time. During March the supply was from the water-works and wells; for twenty-three days in April (except on Sussex Hill) it was from wells alone, and from the end of April from boreholes and water-works, with probably a few remaining wells. Hence the

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[1] "Official History," ii., p. 259.

worst period as regards water supply was undoubtedly between April 4th and 27th, while during May the conditions were improving. As to the quality of the supply, the best came from the boreholes (this was pure at the source) the worst from the wells (this was almost certainly contaminated). The water-works supply had been somewhat improved, and may have been pure at the distribution points, the stand-pipes in the town and camps.

(*d*) *The Sanitary Conditions.*—The condition of the camps on the Western line was not good. Owing to the small depth of soil, the latrine trenches were not satisfactory; for the same reason the burial of the bodies of horses and transport animals was not all that could be desired. The numerous small channels leading to the river allowed of pollution by natives and others, and the dryness of the soil, combined with a prevalent wind and not infrequent dust-storms, rendered the dissemination of infective material easy; on the other hand, the heavy rainfall swept all the *débris* into the river. Hence the infection of the soil which took place was carried to food supplies and water. These conditions were most marked at Modder River camp.

The conditions at Paardeberg, where the main army remained from February 18th to 28th, were even less satisfactory. There was, from the nature of the operations, a fouling of the ground which could hardly be avoided; sanitary arrangements could only be of the most primitive type, and the river water, at least below the laager, was much contaminated. The actual march from Osfontein to Bloemfontein was carried out under less unfavourable conditions, as the troops were constantly moving.

In Bloemfontein itself a pail system of removal had been organised some few years before the war: before this a certain proportion of houses had cesspools attached to them. It does not appear to have differed in any essential respect from other towns of its class in South Africa, of which the general conditions have been already described (pp. 495 *et sqq.*). On March 15th orders were issued for the construction of latrines, and for the removal of night-soil and refuse daily. The execution of this plan naturally took some little time, but the trench latrines, which had of necessity to be employed at first, were gradually replaced by the relatively more satisfactory pail system. This system is of course defective in many ways, particularly in a subtropical climate, and with a wide-spread specific infection it is probably an active agent in dissemination. There should be no difficulty in disposing with safety of all the infective excreta from a recognised case—*i.e.*, one in hospital—

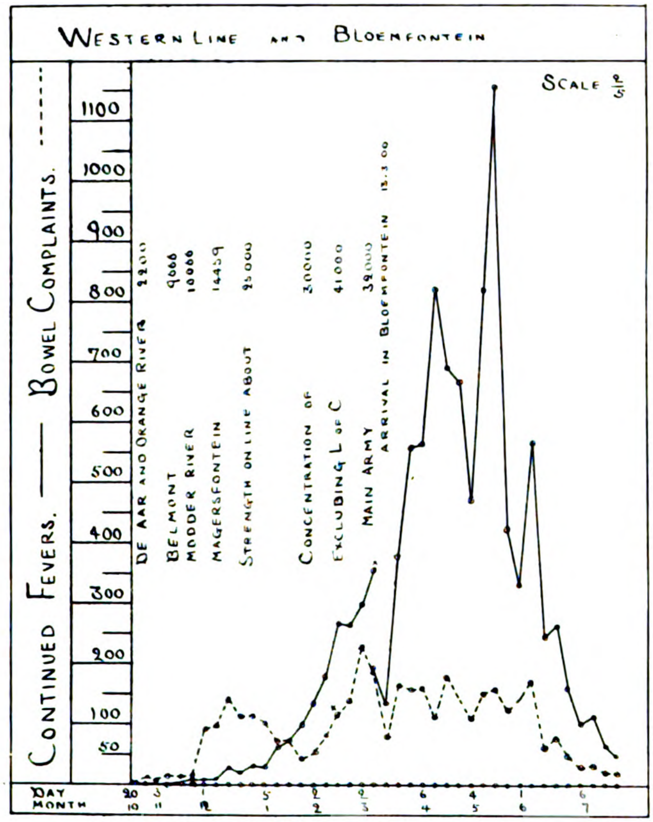
but it is difficult to see how excreta from cases in the preliminary stage, which do not come under observation, are to be dealt with.

The conditions during the halt at Bloemfontein varied almost from day to day. Bodies of troops of various strengths were constantly coming and going; drafts began to arrive; remounts were brought up in great numbers; transport animals were brought in, the whole of this involving temporary camps and some dislocation of the existing sanitary scheme. Further, the rainy season, now at its maximum, made clean sanitation more difficult.

One may say that, as regards the whole period, from the arrival of Lord Methuen's force at Orange River to the time of the advance to Pretoria, every one of those conditions to which the origin or spread of enteric fever may be due, existed and were active: polluted water, infection of food by water, flies, or dust, the presence of young soldiers fresh from England, and (from the date of advance of the main army) of a large number of infected units, amounting to a total of 10,000 men. Every possible condition existed to favour the development of an epidemic, and the results did not contradict previous experience. From the time of the occupation there was a steady improvement in the sanitary conditions in Bloemfontein in every respect, somewhat interrupted in the case of the water supply (as detailed above) and the general sanitation, and after the termination of the outbreak, which may be taken to be the end of July, 1900, Bloemfontein did not in fact show itself to be an unhealthy town.

(*c*) *Disease History of the Area Concerned.*—As regards the Western line, a general indication of the conditions in the Colony has already been given (pp. 498 *et sqq*., vol. xiii.), to which it only remains to add that in Kimberley repeated outbreaks of enteric fever and dysentery were common. Modder River was probably involved in this infection. During our operations sporadic cases had been seen among the Boer Commandoes before Kimberley in the last week of November, and in December a well-marked outbreak began. These cases were sent to hospital at Jacobsdal, situated on the Riet River and draining into it; this may have affected our camp at Modder River, as it was in the fork at the junction of these two streams. The sanitary condition of the positions occupied by the Boers was as bad as possible; this affected the camp at Modder River and the forces passing over these positions in the advance.

Bloemfontein had been subject to annual outbreaks of enteric fever and dysentery; it was on these grounds that expenditure on



x END OF WESTERN LINE RECORD

FIG. 7.

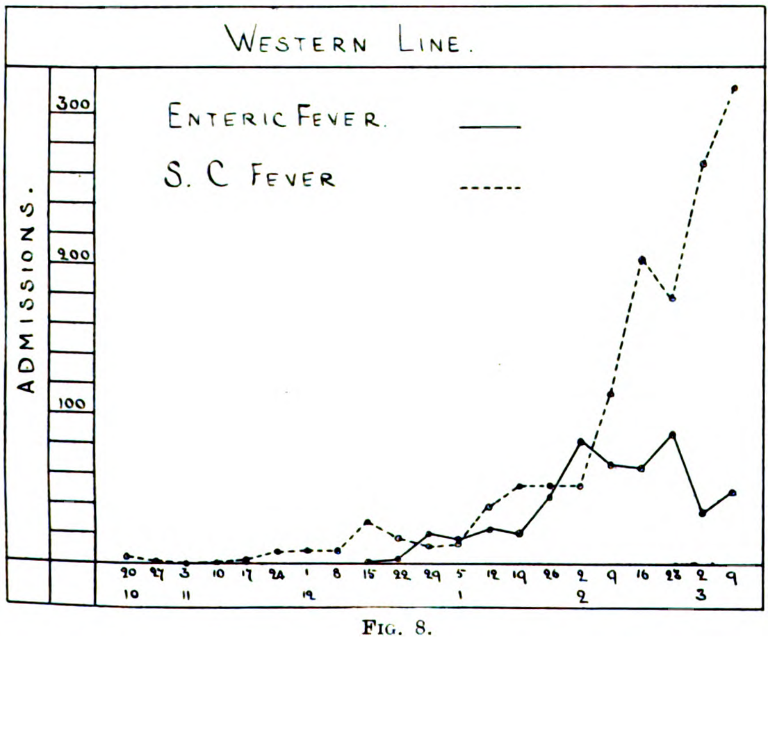


FIG. 8.

the water-works was undertaken. It was said that the prevalence of these diseases had diminished during the last years before the war; if so, this was an exception to the general condition in South Africa, where enteric fever had increased, or had been more frequently recognised. There had certainly been an increase in the townlets and farms surrounding Bloemfontein, with which our troops had been in contact. As elsewhere, the prevalence occurs during the *summer* rains, which in Bloemfontein are prolonged over the first quarter of the year; the maximum rainfall occurs in March, while in April and May 10 per cent. and 5 per cent. respectively of the total rainfall occur. Our occupation began at about the apex of the rainy season. Hence, taking the annual prevalence in conjunction with the rainy season, there seems no reason to doubt that the whole of Bloemfontein was an infected area.

(v.) *The General Incidence of Disease.*

(*a*) The development of the continued fevers and bowel complaints is shown in the first part of fig. 7, drawn from the weekly admissions throughout the periods. It is obvious that the curve is compound, unlike those for Ladysmith and South Natal, since there were large and important increments of strength during the period as noted above. But the general curve shows this sufficiently well, while the details can be seen more distinctly in fig. 8, showing the dissection of the continued fevers, and fig. 9, of the bowel complaints to March 9th, 1900, while fig. 10 is devoted to Bloemfontein itself.

It will be sufficient to give the numbers relating to each station, with some notes on their relations to one another.

The total cases between October 20th, 1899, and July 27th, 1900, were:—

					Total	
Enteric fever	Cases	5,459	Deaths	1,069	10,441 cases,	1,072 deaths
Simple continued fever	,,	4,982	,,	3		
Dysentery	,,	1,855	,,	89	3,819 ,,	89 ,,
Diarrhœa, &c.	,,	1,964	,,	—		

giving case mortalities as follows: Enteric fever, 19·6 per cent.; all continued fevers, 10·3 per cent.; dysentery, 4·8 per cent.; all bowel complaints, 2·3 per cent.

(*b*) Dividing the period at March 9th, we obtain the following figures for comparison:—

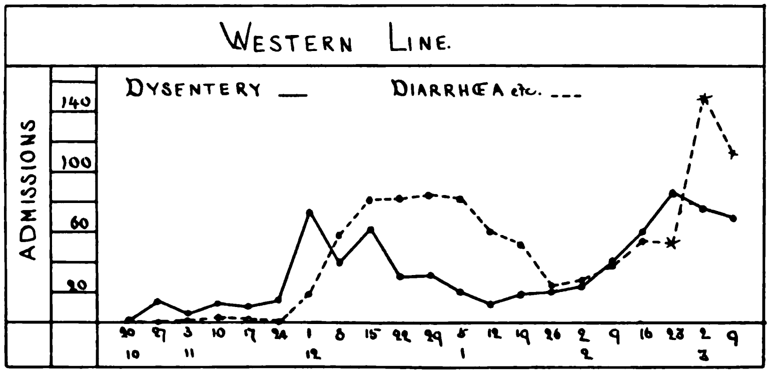

WESTERN LINE.
ADMISSIONS
DYSENTERY
DIARRHŒA etc.
140
100
60
20

FIG. 9.

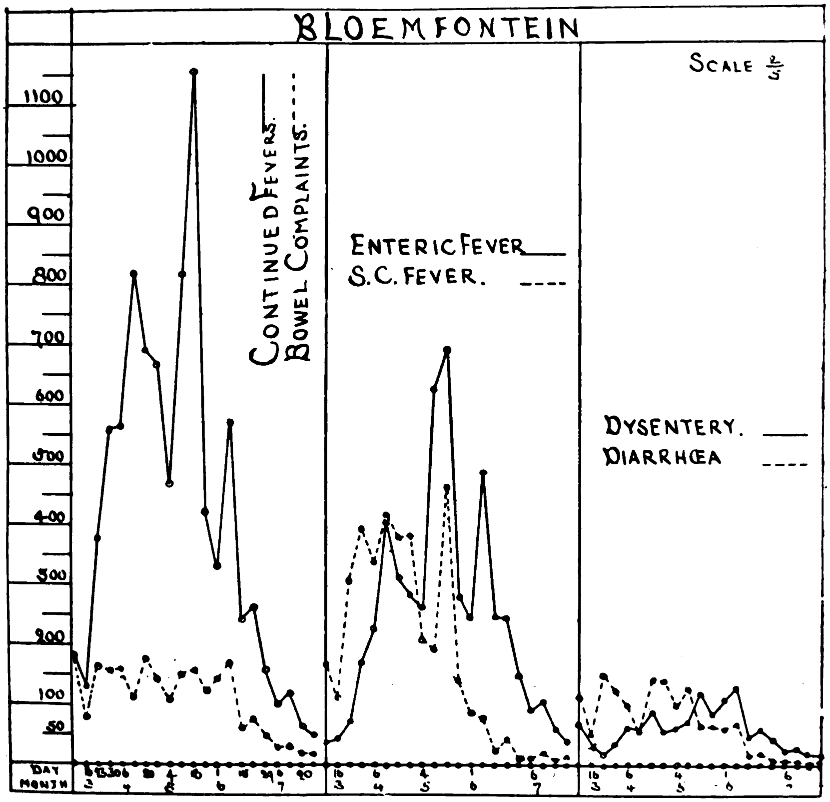

BLOEMFONTEIN
SCALE 2/5
CONTINUED FEVERS.
BOWEL COMPLAINTS.
ENTERIC FEVER
S.C. FEVER.
DYSENTERY.
DIARRHŒA
1100
1000
900
800
700
600
500
400
300
200
100
50
DAY
MONTH

FIG. 10.

		Enteric fever		Simple continued fever		All continued fevers
Western Line ..	Cases	500	..	1,373	..	1,873
	Deaths[1] ..	108	..	—	..	108
	Case mortality	21·6 per cent.		—	..	5·8 per cent.
Bloemfontein ..	Cases	4,959	..	3,609	..	8,568
	Deaths ..	961	..	3	..	964
	Case mortality	19·4 per cent.		—	..	11·25 per cent.
		Dysentery		Diarrhœa, &c.		All bowel complaints
Western Line ..	Cases	718	..	980	..	1,698
	Deaths	8	..	—	..	8
	Case mortality	1·1 per cent.		—	..	0·47 per cent.
Bloemfontein ..	Cases	1,137	..	984	..	2,121
	Deaths	81	..	—	..	81
	Case mortality	7·12 per cent.		—	..	3·82 per cent.

(*c*) *The Case Mortality of the Continued Fevers.*—We have now four groups to compare as regards case mortality (using this as an imperfect index of type), and it is more interesting if taken in relation to the proportion of all continued fevers which were returned as simple continued fever:—

	Simple Continued Fever, per cent. All continued fevers	Case Mortality, per cent. Enteric fever	Case Mortality, per cent. All continued fever
Ladysmith	43 per cent. ..	28·13 ± 0·39 ..	16·00 ± 0·52
S. Natal	86 ,, ..	38·31 ± 2·65 ..	5·57 ± 0·47
Western Line ..	73 ,, ..	21·60 ± 1·24 ..	5·76 ± 0·36
Bloemfontein ..	42 ,, ..	19·38 ± 0·38 ..	11·25 ± 0·16
Whole war	36 ,, ..	13·91 ± 0·10 ..	8·87 ± 0·06

The deaths recorded from the Western line and Bloemfontein do not represent all that occurred among the cases treated there; some cases were transferred to hospitals outside the area, such as Deelfontein and the hospitals near Capetown and to Springfontein, for a part of the period. Hence, at least on the Western line, the case mortality is underestimated.

Taking the probable errors of these ratios into consideration, the following results are obtained, most easily shown in tabular form, where the significance of the differences is shown in the usual way:—

	Enteric fever	All continued fevers
Ladysmith—S. Natal	(+)	+
S. Natal—Western line	(+)	−
Western line—Bloemfontein	−	+
Ladysmith—Blomfontein	+	+

The case mortality for enteric fever in South Natal is so excessive that it indicates a different standard of diagnosis from that obtaining elsewhere; hence where it is used the sign has been

[1] Of these, 35 (one-third) occurred between February 16, 1900, and March 9, 1900.

inclosed in brackets. Ladysmith, then, shows a higher case mortality—*i.e.*, a more severe type—than any other group. The two field groups are indistinguishable. The Western line shows some under-diagnosis of enteric fever as compared with Bloemfontein from the absence of any valid difference in the case of enteric fever, and the considerable difference in the case of the total of the continued fevers.

Now it is quite evident that, among these four groups, the higher the proportion of cases returned as simple continued fever, *the lower the case mortality for the whole group of continued fevers.* In South Natal and on the Western line the case mortality for all fevers was about half that in the other two groups. In both these cases the troops were on the move, more markedly so in Natal, but even on the Western line the greater strength (in February and later) had a much greater degree of freedom than the groups in Ladysmith and Bloemfontein.

To an observer without preconceived ideas this relation could only mean that simple continued fever was a disease possibly distinct from, but certainly having a much lower case mortality than, enteric fever. At the present time, however, even more than at the time of the South African War, with increasing knowledge the general opinion is towards regarding the simple continued fever cases, occurring under the conditions which were associated with these outbreaks, as mild, larval, or abortive attacks of a typhoid affection, having normally no mortality, at least in the original attack. All evidence shows that this is probably correct in nearly every case. It is of the greatest importance, in relation to prevention, that the true nature of the cases should be recognised. On the other hand, it is equally important from the practical side, especially in war, that no case should be regarded as infective unless the probability, in the absence of valid evidence, is in favour of its infectivity. Incidentally these figures show that in all cases, the better marked cases were diagnosed correctly from the first.

In the two groups in question (South Natal and the Western line) some proportion of the milder febrile cases may not have been due to infection of the typhoid group but to some other cause. In the case of the Western line, the extreme heat and scarcity of water during the earlier operations in the Free State suggest a thermal influence, and, as a matter of history, of 372 cases admitted to hospital between October 13th, 1899, and March 31st, 1900, for "the effects of heat" (giving an admission-rate of 7·52 per 1,000 as against 2·28 for the rest of the campaign), 216

occurred on the Western line and 90 in Natal. Reports from field hospitals at this period showed that this was believed to be the cause, and that if transport had been available to carry on these men they would have been able to return to duty within a few days. In both these cases, then, some part of the middle portion of the curve of prevalence may have been due to this cause. One must, however, for purposes of comparison (in South Africa) take the group of continued fevers to be homogeneous, and the time relations of the simple continued fever admissions to those for enteric fever undoubtedly suggest a common origin, in which case the explanation of the difference in severity may lie in variations in the virulence of the infection, the term "infection" including the individual bodily reaction as well as the pathological activity of the agent. Both in Ladysmith and Bloemfontein conditions were such that a highly concentrated agent was probable, and in both the energies of the men had been sapped by exposure, fatigue, and privation, to a much higher degree in Ladysmith, however, which may partly be expressed in the greater case mortality of the whole class of continued fevers. In the more mobile force the proportion of mild infections was much greater.

(*d*) Similarly we may compare the proportion of diarrhœa, &c., to the total in the group of bowel complaints in relation to the case mortalities:—

Group	Diarrhœa, &c., per cent. of all bowel complaints	Case Mortality Dysentery per cent.	Case Mortality All bowel complaints per cent.
Ladysmith	22	5·70 ± 0·36	4·42 ± 0·28
S. Natal	34	3·53 ± 0·35	2·54 ± 0·24
Western Line	58	1·11 ± 0·26	0·47 ± 0·11
Bloemfontein	46	7·12 ± 0·52	3·82 ± 0·28
Whole War	33	3·52 ± 0·06	2·40 ± 0·04

The figures from South Natal are practically identical with the average of the whole campaign. Bloemfontein shows a much greater proportion of (in name) non-dysenteric cases than Ladysmith; but the case mortalities for dysentery and for all bowel complaints do not, on the figures, differ distinctively. The Western line is the only group here which seems to differ from the others to any great extent—that is, in the great proportion of diarrhœa, which was one of the features of the occupation of that line. The case mortality from dysentery is exceedingly low, but some cases died outside the area, which would tend to raise this case mortality.

(*e*) It may be of some interest to add that these four groups

include the following percentages of the total admissions under each head during the whole campaign :—

Enteric fever	12 per cent.	Dysentery	13 per cent.
Simple continued fever	21 ,,	Diarrhœa, &c... ..	15 ,,
All continued fevers ..	15 ,,	All bowel complaints ..	14 ,,

With the exception of simple continued fever, all these percentages are practically identical. Simple continued fever, then, was recorded less frequently after the conclusion of the periods included in these groups.

(*f*) Bearing in mind what has been said regarding the distribution of the troops and the approximate strengths on the Western line, it may be useful to indicate briefly the progress of disease at the various points on that line.

The period is from the date of occupation to March 9th, 1900 :—

De Aar—

Enteric fever	77	Dysentery	59
Simple continued fever ..	55	Diarrhœa, &c...	22
Total	132	Total	81

Here the admissions for bowel complaints were never statistically important. Simple-continued fever remained low throughout, and the first case of enteric fever was reported on December 15th, about the same time as in Orange and Modder River stations, in the civil population of Kimberley, and the Boer forces in front of it, though a few sporadic cases had already been recognized among the Boers. A large number of cases of both groups of disease were treated in the hospitals at De Aar, having been transferred from stations higher up the line.

Orange River—

Enteric fever	142	Dysentery	162
Simple continued fever ..	90	Diarrhœa, &c...	107
Total	232	Total	269

There was a small incidence of febrile disease from the very first, unimportant up to December 22nd, when the first case of enteric fever was reported. From that date there was a steady and considerable rise to the maximum in the last week in January (associated probably with the increased strength on the line), when there was a drop followed by another rise immediately before the advance into the Free State.

The admissions for bowel complaints, as has been seen in Natal, began to assume prominence earlier and attained their maximum development before the febrile diseases began to develop. Dysen-

35

tery was the first of these diseases to appear, and it was replaced later by attacks which were recorded as diarrhœa.

MODDER RIVER—

Enteric fever	249	Dysentery	283
Simple continued fever ..	703	Diarrhœa, &c...	524*
Total	952	Total	807

* Does not include cases after February 16th.

A great development of bowel complaints occurred immediately after the occupation of Modder River. This development attained its maximum, and its decline was well established before the febrile diseases became important in the middle of December. This condition appears to have been definitely associated with the water supply, which contained so much fine mud that its filtration was practically impossible. Here diarrhœa, familiarly termed the "Modders," was the prominent feature at the outset, and throughout the period maintained its predominance, dysentery furnishing fewer cases and declining more rapidly. One does not of course expect to find figures for diarrhœa which represent the actual prevalence; in many cases, the attacks were endured without any record in our statistics. We probably do not have on record more than half the cases that occurred, and this applies to every place in South Africa during the war.

Febrile disease began to be suggestively important soon after arrival at Modder River, and enteric fever, after maintaining a fairly steady incidence from the middle of December to the middle of January, increased rapidly, at which period, too, simple continued fever showed still greater development. Probably a large proportion of the cases were enteric fever, though some unknown proportion may have been due to other causes.

DURING THE EARLY OPERATIONS IN THE FREE STATE, FEBRUARY 9TH TO MARCH 3RD.

Enteric fever	32	Dysentery	201
Simple continued fever ..	520	Diarrhœa, &c...	327
Total	552	Total	528

Of the simple continued fever, 386 cases occurred between February 23rd and March 9th, and 260 of the diarrhœa cases occurred during the same period—that is, during the investment of Paardeberg and the few days prior to the advance. As has been shown above, probably some of the simple continued fever cases were due to the effects of heat.

The following account by Lieut.-Colonel G. Coutts, R.A.M.C., who was at Modder River, gives fuller details regarding the out-

break there, and some particulars regarding the results of the early operations in the Free State:—

"Lord Methuen's force, which numbered about 13,500 men, occupied a level plain enclosed by a wide bend of the Modder River on the East and South, rising gradually towards the entrenchments of the enemy, which were five miles distant. The soil was sand with some admixture of clay, overlying a compact bed of calcareous conglomerate. The scanty vegetation quickly disappeared with the traffic, leaving a surface of fine loose sand.

"The buildings which went to form Modder River consisted merely of the railway station and its attached administrative buildings, and the schools and dwelling-houses of the employés. In addition there were two hotels which in days before the war were supported by visitors from Kimberley. The division was encamped as follows: The Guards Brigade was located on the east side of the Modder, between it and the Riet; the 9th Brigade occupied ground on the east side of the railway; the Highland Brigade was on its western side; and between the Infantry and the river on both sides of the railway were the Cavalry, Artillery, Supply and Remount Depôts, &c. The Field Hospitals and Bearer Companies were encamped with the Brigades to which they were attached, and the Divisional Hospital in a central position.

"Drinking water was drawn for some time from the river. It was of a brown colour, full of suspended matter, and gave off gases when kept for a short time in a bottle. Various methods were adopted to purify it, as precipitation of suspended matter with alum, filtration through Berkefeld filters, and boiling. The latter was effected under difficulties, owing to the scarcity of fuel, the absence of suitable vessels for carrying out the process and for subsequent storage. On the whole, it is probable that this process was very ineffectively applied. Filtering was with the Berkefeld filter practically impossible without previous precipitation of the suspended matter; the filters quickly became blocked. After a time fairly deep wells were used, but the supply from them was hardly sufficient, and the water sometimes milky. The soldier was not greatly impressed with the necessity of purifying his drinking water; not infrequently men were discovered filling their water-bottles in the river at whatever point they happened to be nearest.

"The latrines were made in the usual form by each unit in a position best suited to its own part of the camp, with the result that considerable areas of the soil were soon polluted. This was assisted by the transport animals picketed with each unit. The

soil had little deodorizing power, and disinfectants were not at first available.

"The weather was hot and for the most part rainless, and high winds were frequent, often lasting the greater part of the day. They blew before them blinding clouds of dust, which rendered food gritty and filled one's nose, eyes, ears, and mouth; and carried latrine paper and other light bodies from one end of the camp to the other. Flies multiplied rapidly and were a great source of annoyance to both the sick and the healthy, besides acting as carriers of the disease.

"Enteric fever was first clearly recognized on December 18th. Almost from the first diarrhœa was frequent, so frequent as to acquire among laymen the name of 'Modders.' In a large number of cases it subsided after a few days' careful dieting and treatment. Dysentery was not a serious complaint. Commencing about the middle of December, 1899, enteric fever by the end of that month caused eighteen admissions to hospital, from nine different corps. This wide dissemination might appear to argue a water-borne origin, but the Guards regiments, who took most pains to purify their drinking water, suffered most; whereas the Highland Brigade, who were backward in adopting precautions, contributed their first case of enteric fever to the Stationary Hospital on January 12th, 1900. Their lines occupied the north-western corner of the camp, and the prevailing western winds blew diagonally across it from the open veldt. They did not therefore share to the same extent as the other units in the dust from other camps.

"On a review of the circumstances of this outbreak, therefore, it appears that the most probable cause was the infected dust derived from the latrines, and carried into food and drink by the wind. The influence of contaminated water cannot, it is true, be excluded; but, as was afterwards abundantly shown in the course of the war, men might be scrupulously careful about the quality of their drinking water and still contract the disease, and in this camp the regiments that took most care with their drinking water suffered rather more than the rest. This presupposes the existence of the germs in some parts of the camp, their ingestion and gradual increase, and the subsequent infection of the latrines by incipient or ambulatory cases; but it was a matter of common knowledge that a continued fever, sometimes called 'veldt fever,' was common among the inhabitants of the district at certain seasons. Between December 24th, 1899, and March 10th, 1900, there were 283 cases with 61 deaths, or a mortality of 21·55 per

cent. This high percentage is partly accounted for by the fact that many of the milder cases were sent towards the base as simple continued fever, diarrhœa, &c., but many of the cases were very acute and ended fatally from toxæmia. Of this number, the Guards Brigade, 3,780 strong, contributed 48 admissions, with 14 deaths; the 9th Brigade, 2,839 strong, 53 admissions, with 12 deaths; and the Highland Brigade, 3,311 strong, 35 admissions, with 10 deaths. The Cavalry, with the exception of the 9th Lancers, which was the longest in the camp, were not severely attacked, but the Royal Artillery and the Departmental Corps suffered severely. The Royal Army Medical Corps had 26 cases and 3 deaths, but many of the attacks could be traced to attendance on the sick. The cases not belonging to the 1st Division were left behind by Lord Roberts's force, or were sent back from it by sick convoy. The Guards Brigade and the Highland Brigade accompanied this force, and continued to send back cases to Modder River or Kimberley until the force had left Osfontein. Amongst the sick convoys from Paardeberg and beyond, dysentery appeared to be more common than it had been at Modder River."

BLOEMFONTEIN—

Enteric fever	4,959	Dysentery	1,137
Simple continued fever	3,609	Diarrhœa, &c.	984
Total	8,568	Total	2,121

The distribution of the cases is shown in fig. 10.

Dealing first with the curve for continued fevers, it shows three maxima separated by deep depressions. The first maximum, on April 13th, differs from the others, in that it probably represents exclusively the development in the main army which crossed from the Western line, for the railway was not in full working order till towards the end of April, and few troops entered Bloemfontein during the first half of that month. The probable incubation period, too, supports this hypothesis, assuming all the cases to be infections of the typhoid group. The sharp rise to the maximum began immediately after the occupation—*i.e.*, about March 16th—or in the seventh or eighth week from January 26th—*i.e.*, approximately from the date of the concentration on the line for the advance to Bloemfontein. The two other maxima—of May 18th and June 8th—are in a different category. The body of troops in which the cases occurred cannot be described simply and accurately, and accordingly time relationships are obscured. That they were due to new infection, partly among freshly arrived troops, superadded to a declining prevalence among the older residents, is

probable, for the general character of the curve from April 13th to the end of the period is suggestive of a gradual fall, although interrupted by these short and sharp rises. It is perhaps worth noting that, while the first maximum required at least four weeks for its development, the obvious rise of the second maximum lasted only two weeks, and of the third only one week—*i.e.*, the actual development is obscured by the antecedent prevalence. There are great difficulties in the way of ascertaining the actual distribution of the cases among the troops and their relation to the strength, and it is quite possible that the true prevalence curve would not show this division into three parts, but a steady rise and fall to and from a single maximum. This, however, would not necessarily interfere with the composite nature of the curve, which we know must in fact be the case, although, instead of three, there may be many elements, nor would it have any effect on the assumption that the first maximum is the culminating point of the development in the main army, which began about the date of concentration on the Western line. Doubtless the concentration of the rise in the two later maxima has something in it that suggests a widespread infection over a comparatively short period of time, where a number of cases, infected together, matured about the same dates. It might be the case that the maximum of May 18th was the apex of an epidemic of short development, due to the use of contaminated water from wells, but this at the most would not carry the origin back beyond the last week in April, when the only important event in connection with the water supply was the forcing into the town mains (which had been disused since April 3rd) of the excellent water from the borehole at the Willows. There is no reason to suspect any contamination of the mains such as would be necessary to produce a widespread infection of this type. It is important to remember that a concentration of troops had taken place in and near Bloemfontein on May 3rd, and that the sick were sent back daily by rail till the occupation of Kroonstadt on May 12th. This probably did account for a portion of the increase in the *admissions* about this date, as men held on in the hope of the advance as long as they could, but it hardly helps in explaining the origin of the cases.

It is even more difficult, practically impossible, to trace any connection between the smaller maximum of June 8th and any other known condition. Indeed, from the end of April the conditions had steadily improved. The sanitary condition of Bloemfontein had become distinctly better, food supplies were no longer

short, tents and blankets had been brought up, the water supply had been improved, the camps of the Sixth Division had been changed, while most of the other troops had been outside of the town area for a portion of the time. The weather, too, was improving; usually fine, it was cold at night and especially in the early morning. The various sources of infection no doubt still existed, but it is hard to believe that, after all that had been done, these can either have been so frequent or so intense. It must, however, be pointed out that this maximum is only four weeks later than that of May 18th, which may indicate some direct infection.

The dissection of the continued-fever curve into its elements does not elucidate the question in any way, but it shows very distinctly the change of opinion, or of fashion, in the diagnosis of these fevers from the middle of May, a change that had no basis in any variation in the type of disease. There is little doubt that during the first half of the period enteric fever was not diagnosed frequently enough—the milder cases were returned as simple continued fever—but during the latter half there is little question that cases were returned as enteric fever which in all probability were not of that type at all.

As regards the bowel complaints, the striking feature is the oscillation about a mean level until the second week in June, so reproducing the features seen in the Natal Field Army. During the first half of the occupation, dysentery is seen to be less frequent than diarrhœa, while the relations were reversed during the last half. No explanation of this change can be given, if it was in fact real, and not merely diagnostic.

DARK-GROUND ILLUMINATION IN THE DIAGNOSIS OF SYPHILIS.

By Capt. L. W. HARRISON.
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THE discovery of the *Spirochæta pallida* by Schaudinn in 1905 was largely discounted at first, from the point of view of its clinical utility, by the extreme difficulty of demonstrating the organism. Under the ordinary illumination the most expensive apochromatic objectives and perfect microscopic arrangements generally were required to demonstrate it in the living state, and, even when thus aided, the eye of a highly-trained expert was required to make a diagnosis.

The staining methods introduced by Giemsa, Leishman, and others brought the diagnosis of syphilis by microscopic observation of the spirochæta more nearly within the reach of the clinician; but, again, the fact that all the staining methods require more than ordinary skill, and are frequently attended by failure after the expenditure of much time and patience, renders this method of comparatively limited utility from a purely diagnostic point of view. A method, therefore, which affords us a means of demonstrating the *S. pallida* in less time than it takes to prepare and stain a preparation by Gram, and of demonstrating it, too, with a certainty, and in an abundance, which admits of no doubt whatever as to the diagnosis in practically every untreated syphilitic sore, must commend itself to all who realise the great importance of an early diagnosis in the treatment of this disease. The literature[1-4] on the subject of dark-ground illumination is already extensive, and some apology may be needed for this further addition; but the consideration that possibly the publications containing the papers may not have reached many officers will, perhaps, be its justification.

I propose in the following notes to describe briefly the principles of dark-ground illumination, to show how a microscope can be

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[1] Gastou, "L'Ultra-Microscope dans le Diagnostic Clinique et les Recherches de Laboratoire." Paris: Baillière et Fils, 1910.

[2] Gastou et Commandon, "L'Emploi de l'Ultra-Microscope en Clinique, principalement dans le Diagnostic de la Syphilis," *Soc. de Méd. de Paris*, March, 1909.

[3] Coles, "Spirochæta Pallida," *British Medical Journal*, May, 1909.

[4] Ogilvy, "Dark-Ground Illumination for Bacteriological Microscopy," *Lancet*, October 2nd, 1909.

fitted with the necessary apparatus, to indicate the light arrangements required, and to give a few practical hints on the preparation and mounting of the specimens for examination.

The method consists in focussing on the organism a strong light consisting of very oblique rays, so that it shows up as a brightly-illuminated silvery spiral on a dark or intensely black background. For this purpose, in place of the ordinary substage condenser of the microscope, which is temporarily removed, a special reflector is fitted. This is made in two main forms. Both are perfectly effective in producing the desired result, and opinions regarding the respective merits of each are fairly evenly balanced.

Fig. 1 represents the form now specially known as the Zeiss pattern. It is a perfected form of the paraboloid introduced by Wenham in 1856.

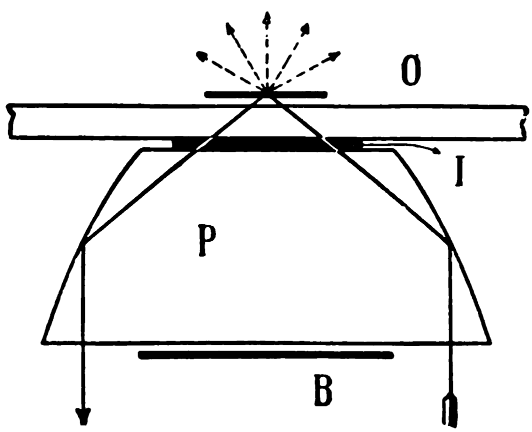

Fig. 1.

P is a concavo-convex piece of glass, the convex curvature of which represents an exact rotation paraboloid. B is a disc (silvered on its under surface) which acts as a central stop, and blocks out all the rays coming from the mirror with an aperture of from 0 to 1·1. The rays of light of greater aperture than this are reflected from P, and take the path indicated in the diagram. They pass through the immersion oil, I, which fills the space between the microscope slide, O, and the paraboloid condenser, and come to a focus on the upper surface of the slide.

When the medium above the cover-slip (the short horizontal line at the top of the figure) is air, those rays which do not impinge

on any object between the cover-slip and slide, passing on and striking the cover-slip very obliquely, are reflected from its surface. This occurs when a dry objective is being used. When, however, the medium is homogeneous with the glass, as when an oil-immersion objective is being used, the rays pass on into the oil, and would be taken up into the microscope by any objective with a numerical aperture of more than 1·0. On this account, as it is the object of the system to exclude all rays not diffracted by the objects under examination, it is necessary to cut down this aperture when using an oil-immersion lens (which has an aperture of over 1·0). This is readily done by inserting a funnel stop, a simple device

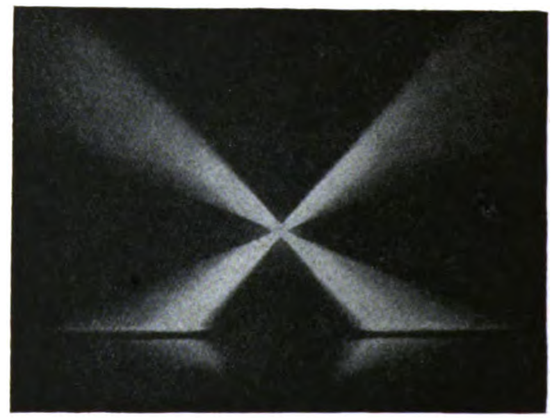

FIG. 2.

sold by all microscope makers, which acts by curtailing the diameter of the back lens of the objective; the stop can be inserted and removed as occasion requires. Fig. 2 is a photograph of the rays of light from a Leitz condenser (the second form to be considered, but applicable, with slight modifications, to this case also), which serves to illustrate the points mentioned. The focus of the rays is at the meeting point of the four cones, and the rays are passing on into a homogeneous medium above the cover-slip.

By these arrangements, rays which pass through the medium in which the object is mounted without impinging on that object are not represented in the image, and the dark background is produced.

Those rays which strike any objects in their path from the condenser to the cover-slip, being refracted by such objects, are

bent so that they can enter and be passed by the objective, and are consequently represented as brightly-illuminated images of those objects. Their course is represented by the dotted lines above the cover-slip in fig. 1.

Fig. 3 represents the form designed by Ignatowsky. It is generally known as the Leitz pattern.

It differs from the Zeiss pattern in that the illumination is derived by reflection from two spherical surfaces.

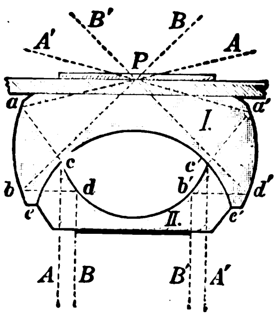

FIG. 3.

The external reflector, *a b a'd'*, is a single spherical surface which is achieved by joining the two bodies I. and II. on a spherical surface, *e c c'e'*. The paths of rays are represented by the dotted lines. The central rays are stopped out by a central disc (the thick horizontal line shown between *B* and *B'*). The unstopped rays from the mirror are represented by *AB B'A'*. They strike the inner spherical surface at the points *c d b'c'* respectively, and are reflected from these on to the outer spherical surface at *a b d'a'*. They are again reflected from the outer spherical surface and come to a focus at the point *P* on the upper surface of the slide. Their further course and the procedures dependent thereon are the same as in the Zeiss pattern.

Comparison between the two forms described is very difficult. As just mentioned, both are equally effective for diagnostic purposes. The Zeiss pattern has an iris diaphragm fitted which can be closed slightly when using an intense source of illumination such as a Nernst projector lamp or a stronger illuminant, and this has the effect of producing an intensely black field on which the silvery objects stand out in beautiful contrast. On the other hand, the Leitz pattern allows a somewhat feebler source of light.

Each can be adapted to any microscope by any maker, and

all that is necessary is to send the sleeve and existing substage condenser. Some firms undertake this work from information as to the make and model of one's microscope, but I think that it is safer, if one cannot send the sleeve, &c., to be adapted, to send the exact inside diameter of the sleeve and the height from the top of the sleeve to the top of the condenser.

A few practical points may be mentioned here.

The focus of the dark-ground reflector is exceedingly sharp, and it is necessary to use a slide of the exact thickness recommended to be used with each pattern of condenser. The easiest plan is to order a supply of the correct thickness from the maker. It is better to have a slide which is too thin than too thick, because in the former case one can always lower the condenser, within limits, so as to bring the focus on to the upper surface of the slide. If the slide is much too thin, however, it would sag in the centre over the condenser, and also the oil would leave the lower surface of the slide before the focus was reached. Even then one might back it up by inserting a cover-slip or two between the slide and condenser, but I should prefer to take a fresh specimen.

It is necessary to fill the space between the slide and condenser with cedar oil. One can do this in two ways: either by dropping oil on the top of the condenser, which is slightly lowered for the purpose, placing the slide in position over the condenser, and racking up the latter till it is flush with the stage; or, according to a plan I adopt, which is more convenient, dropping enough oil on the lower surface of the slide opposite the specimen, placing the slide on the stage, cover-slip up, over the lowered condenser, and then racking up the latter as before.

Having racked up the condenser, the immersion oil should be examined to see that there are no air bubbles imprisoned in it. A very small air bubble in or near the field of observation will, by reflection of light from its surface, throw so much light into the field as to destroy the darkness of the background.

The condenser should be centred correctly. Some microscopes have their condensers automatically centred, as in the Zeiss pattern, so no further adjustment is necessary, provided the objective centres to the ordinary condenser. Others are provided with centering screws, and in this case the centering is extremely simple. There is a faint ring scratched on the upper surface of the Leitz pattern, and all that is necessary is to bring this into the focus of a two-thirds objective and a low eye-piece, and to work it into the centre of the field by means of the centering screws.

Dark-ground condensers are also made by Leitz and by Reichert, to place on the stage of the microscope. They have to be centred by hand and are much more inconvenient to work, without affording any compensating advantage.

Dark-ground illumination can also be effected by putting a central stop below the ordinary condenser, to cut out the axial rays. This method has the disadvantage that, the rays being refracted instead of being reflected as in the case of the special condensers, chromatic correction is not effected. It is not suitable for demonstrating *S. pallida*.

Regarding objectives, one is recommended to use apochromatic 4 mm. and 3 mm., if one uses dry lenses. These are usually combined with compensating x8 or x12 eye-pieces. Dry lenses, however, have some disadvantages which are important to those who do not work in a laboratory fitted with every accessory. The great disadvantages of the combinations above mentioned are that they demand a stronger source of illumination than is always available, and also that, unless a correction collar is fitted to the objective, one is practically limited to using the exact thickness of cover-slip which is suitable to that objective, though one may be able to correct by alteration of the tube-length at a sacrifice of definition.

On the other hand, a $\frac{1}{12}$-inch oil-immersion lens fitted with the funnel stop above mentioned and combined with a 2 or 4 eye-piece has the advantage that it does not need so strong a source of illumination; it is also independent, within ordinary limits, of the thickness of the cover-slip, and one does not have to buy a new objective. I have worked with all the above combinations, and, though I find the 4 mm. apochromatic lens fitted with the correction collar most convenient for making a speedy diagnosis, I prefer the image given by the oil immersion.

Regarding sources of illumination and arrangements generally for concentrating on the mirror a sufficiently strong light to illuminate the *S. pallida*, I have made a number of experiments with a view to testing the utility of such sources as are available everywhere.

When electricity is available, the arc (provided in a convenient form by Leitz under the name of the Lilliput lamp), ordinary Nernst with the globe removed, or the Nernst projector with parallel filament, can be used. With gas, the inverted mantle is the best. An arrangement sold by Zeiss (fig. 4) is an inverted

mantle with a mounted glass flask filled with water. It gives an excellent illumination, but the flask is rather clumsy.

When neither gas nor electricity can be obtained, the best source of illumination which I have tested is provided by a lamp sold by Baker. It depends on an upright mantle, which is made incandescent by burning petrol vapour. The petrol is contained in a small can which is placed anywhere more than 6 feet above the lamp—say, outside the fanlight in an Indian bungalow. The petrol is conducted to the lamp by a thin, flexible pipe which can

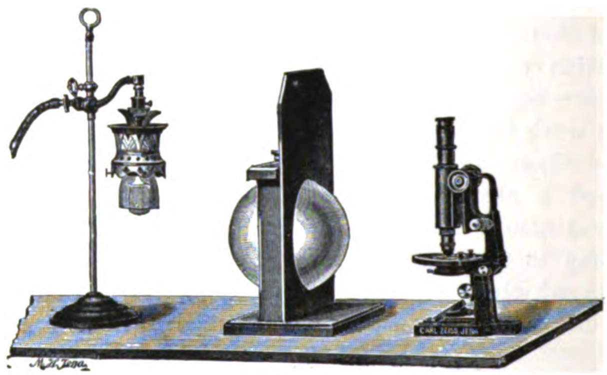

FIG. 4.

be coiled up like a piece of thick copper wire when one is travelling, and the flame is controlled by a screw at the base of the lamp. It claims to give about 70 candle-power, and to burn a gallon of ordinary petrol in eighty hours.

Another very handy illuminant, especially when combined with a Nelson bull's-eye condenser, is known as the Lampe Sol, sold by Zeiss. A mantle of special size is used, and it burns methylated-spirit vapour. It has the advantage that it is very easily packed and handled, but it does not give so strong a light as the first lamp mentioned.

I have used a motor-bicycle acetylene lamp, which is fitted with a Mangin-mirror reflector behind, and obtained excellent effects with both types of condenser, without using a bull's-eye. Using a Leitz condenser, I have seen the *S. pallida* with an oil lamp and a Nelson bull's-eye, but, naturally, the illumination was not brilliant. With most of the above some form of bull's-eye condenser should be used to concentrate the light on the mirror.

The following are, in my experience, the best ways of obtaining and mounting the material for examination :—

Select a slide of the thickness recommended to be used with the particular type of condenser available, and a thin cover-slip, and clean them both well. Place the slip handy, grasped in a pair of Cornet forceps. In the case of a chancre, clean the sore with saline and scrape its margin gently with the edge of any scarifier. The aim should be to take off the superficial epithelium and no more. If one dives into the sore with the point of a knife, it is very painful, and there is a free flow of blood. Quite probably some blood will flow, however gentle one is, but the less blood the better. If blood flows, dab it gently with dry cotton-wool once or twice, and then wait a minute or so for it to clot. The small clot will adhere to the sore and serum will ooze through. Take the cover-slip held in the forceps and just touch the place with it so as to pick up a drop of serum. If the amount picked up on the cover-slip does not seem likely to quite fill the space between the slide and slip, or if the drop seems to have much blood in it, it is necessary to use a diluent. Opinions differ as to the diluent to use; some prefer distilled water,[5] on the grounds that it lakes the blood, and causes the spirochæte to swell up and become more easily visible. Personally, if a diluent *has* to be used, I prefer a saline solution of a strength of about 0·65 per cent. It leaves the few red cells with their margins intact, and the latter are convenient for obtaining a rapid focus.

In the case of a condyloma the surface is similarly scraped, while in that of a papular rash I have found the following plan answer well: The surface epithelium is scraped off, and then, having heated the blind end of a test-tube and smeared its lip with vaseline, the test-tube is firmly applied so that its mouth circumscribes the papule. The test-tube acts as a convenient cupping glass and extracts more serum than could otherwise be obtained. A small blister on the affected area, removal of the raised epidermis, and gentle scarification of the raw area exposed is an effectual plan of obtaining spirochætes from a papular rash.

Having obtained the drop on the cover-slip, place the latter on the slide so that the drop flows between the cover-slip and slide in the ordinary way. A very thin film is best, and a good plan to

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[5] Gastou et Commandon, "L'Ultra-Microscope et son rôle essentiel dans le diagnostic de la Syphilis," *Bull. de la Soc. Méd. des Hospitaux de Paris*, March, 1909.

obtain this is to place a piece of lint on one's knee or thigh and, turning the slide over, press fairly firmly down on it with the cover-slip down, the excess fluid flows out and is taken up by the lint.[6] Finally, ring with vaseline.

Place the preparation on the microscope stage, not forgetting to fill the space between the slide and condenser with oil, and then arrange the lighting arrangements. These vary with the particular combination of light and bull's-eye condenser used, but the general principle is to obtain a bright image of the illuminant stretching across the plane mirror. Arrange the light and then move the bull's-eye about till a bright image of the illuminant is obtained on a piece of paper held across the mirror. Then, on manipulating the mirror, a bright spot of light appears in the centre of the coverslip. Having obtained this, bring the objective down to the cover-slip, on which a drop of oil has been placed if an oil-immersion lens is being used. In doing this with an oil-immersion objective, I find it most convenient to bring the objective down till it just touches the slip, watching from the side meantime; then, applying my eye to the eyepiece, I rack slowly back with the coarse adjustment, transferring to the fine adjustment when the image begins to appear. This practice is possibly heresy, but when so very little throws the illumination out, as in dark-ground work, I think it is safer to retreat from the specimen than to grope downwards in the dark, possibly through the cover-slip.

Having obtained the image, a little judicious manipulation of the mirror and fine adjustment will bring it to its best.

The *S. pallida* seen under these conditions appears as a silvery white, very attenuated corkscrew, varying in length from 4 to 25μ, with perfectly regular undulations, the depths of which are very nearly the same as the distance from the crest of one undulation to that of the next (1 to 1·2μ). Its movements of progression are very slow, and it is quite easy to keep the same specimen in the field for hours together. It bends on itself, rotates on its long axis, and often appears to draw its spirals together and to lengthen them out again. Once seen and noted as to these characteristics, it cannot well be mistaken, for any other spirochæte save perhaps *S. pertenuis* of yaws. The only other spirochæte for which it could be mistaken is *S. dentium* of decaying teeth; this is rather shallower in the depth of its undulations, which are slightly

[6] Bayly, H. W., "The Use of the Ultra-Microscope for the Early Diagnosis of Syphilis," *Practitioner*, February, 1910.

wider apart. *S. balanitidis* is thicker, not nearly so regular, and its undulations are shallower and wider.

It is a good plan to examine the spirochætes obtained from syphilitic papules and to note their appearances carefully, so as to fix a clear impression of the classical appearances in one's mind. It is a bad plan to venture on a diagnosis on the strength of an imperfect view and an impression that the organism seen is "something like" *S. pallida.* In a fresh untreated sore spirochætes of classical appearance abound, as a rule; it is a frequent occurrence to find six per field, and on occasion I have counted fifteen or more.

It is unnecessary for me to comment on the enormous advantages which have been given to us by this beautiful and convenient method of diagnosis. By its means, and by that of the Wassermann reaction, the treatment and general management of syphilis will become a much more exact science than heretofore, and the importance of both to the Army cannot be over estimated.

NOTES ON MILITARY MAP READING.

By Major A. P. BLENKINSOP.
Royal Army Medical Corps.

(*Continued from p.* 284, vol. xiv.)

"When examining a contoured map, three preliminary points should be attended to before commencing to answer any question connected with it:—

"(1) What is the scale?

"(2) What is the contour interval?

"(3) Where is the north point?"

—(Notes on Map Reading for Army Schools.)

All these points have been fully dealt with in previous articles, and they are instinctively observed when one has had a little experience of working with maps.

Road Reconnaissance and Report.

The general object of the reconnaissance by a medical officer is to gain such information with regard to the road, its breadth, condition, gradients, &c., as would be necessary for the movement of field medical units or for the transport of sick and wounded. Information regarding alternative routes (by road, rail or water), should be obtained and, if practicable, these routes should be inspected. The country through which the road passes should be observed with a view to ascertain how far troops traversing it might be exposed to fire from positions likely to be occupied by the enemy. All areas suitable for camping grounds should be noted. Allowing that the area provides sufficient accommodation for the units (*vide* pp. 32, 33, Field Service Pocket-book), the essentials of a good camping ground are dryness of surface, a good and sufficient water supply, a slope which should not exceed 5° ($\frac{1}{10}$ gradient), and facility of approach. Secondary points to consider are the aspect of the slope, facilities for obtaining fuel and forage, shelter from prevailing wind, &c. It should also be remembered that troops *en route* should always be encamped near the line of march, and that, if possible, old camping grounds should be avoided. Instructions regarding the selection of sites for dressing stations and field-ambulance camps will be found in paragraphs 14 and 21, Royal Army Medical Corps Drills and Exercises. These should be studied in conjunction with the foot-note

on p. 14, Field Service Regulations, Part I, which gives the ranges of rifle and artillery fire.

As regards the road itself, the following points must be observed and reported upon:—

The general direction of the road in points of the compass.

Its width and boundaries—*i.e.*, hedges, ditches, fences, &c. Can wheeled traffic turn on and off the road easily?

Whether the country on either side is open or enclosed—*i.e.*, can the troops march alongside, or are they confined to the road?

Gradients, especially those which would interfere with the movement of field transport.

Whether the surface of the road is good and likely to stand heavy traffic, and whether there are any obstacles to prevent troops from keeping up the ordinary rates of marching?

Landmarks, such as churches, chimneys, &c., which may be useful as guides should be noted.

Bridges passed over, their width, length, strength, construction (stone, iron, wood, &c.), approaches, whether there are fords alongside or near. If fords exist, their practicability as regards depth, bottom, and current of stream.

In fact, to sum up, in road reconnaissance all ground, &c., that the road passes *under*, *over*, or *through* should be noted and carefully reported (Notes on Maps and Map Reading, Lieutenant-Colonel Brunker).

It may also be required that information regarding supplies in villages and farms on or near the road should be collected, and that any chemists' shops, or other shops from which drugs, surgical materials, beds, bedding or other hospital equipment could be obtained should be noted.

In the preparation of orders, reports, and messages the general rules contained in Sec. 9, Field Service Regulations, Part I., should be strictly complied with.

Estimation of the Time a Body of Troops would take to March by Road from one given Point to Another.

The ordinary rates of movement of troops are given on p. 28 of the Field Service Pocket Book. An infantry brigade should maintain an average rate of 1 mile in eighteen minutes on a good road, or allowing for short halts, 3 miles an hour. For wheeled transport a rate of 2½ miles is good going under favourable conditions. If any unusual obstacles are to be encountered, they must be taken into consideration and the necessary deduction should be

made from the rate of marching. The rate of march being determined, the points of the dividers should be set apart the distance by scale which the troops would pass in one minute. The length of the road being then measured by stepping along it with the dividers from one place to another on the prescribed route, the number of minutes to be occupied by the march can readily be obtained.

Thus for a battalion of infantry marching at the rate of 3 miles an hour, the dividers should be set 88 yards apart.

Large bodies of troops would move at a slower rate. Thus a division would probably only cover 2 miles an hour, and the dividers would then have to be set sixty yards apart to show the length of road traversed in one minute.

This method of calculating the time occupied in a march is suitable only to large-scale maps. It cannot be applied to 1-inch or smaller scales. In these cases the distance by road from one point to another is obtained by setting the dividers apart by scale to a small measurement, say ½ inch representing 880 yards on the 1-inch scale, and stepping the distance by road from one point to the other, making allowance for any abnormal twists and turns on the route. The total distance of the march in yards is then divided by the number of yards the troops would cover in one minute; the result gives the number of minutes to be occupied in the movement ("Studies in Map Reading and Field Sketching," Lieut.-Col. Wilkinson Shaw).

Before bringing this series of articles to an end, I would again impress upon my readers that one cannot learn how to use maps for military purposes by reading or by theoretical instruction alone. Practical work with maps, both in and out of doors, is absolutely essential before any thorough knowledge of map reading can be acquired. The following suggestions with regard to this practical work are largely taken from "Studies in Map Reading" by Lieut.-Col. Wilkinson Shaw.

Indoors.

(1) Estimate by the eye, on maps of various kinds and scales, direct distances between points and distances along roads.

(2) Estimate the time a battalion, division, or wheeled transport would march along a road from one given point to another, taking into consideration ascents, descents, and obstacles.

(3) Estimate the ranges of small-arm and artillery fire from selected points and positions. This can be accomplished by tracing

curves with the dividers set to distances on the scale of the map corresponding to the various ranges.

(4) Ascertain the relative compass bearings of different points on the map, correcting magnetic to true bearings.

(5) Estimate slopes of ground: (1) using the scale at the edge of the service protractor; (2) calculating the vertical interval from contours or spot levels and measuring the horizontal equivalent by means of the scale of the map.

(6) Estimate the visibility of points, the one from the other.

(7) Mentally calculate the corresponding scales in inches from representative fractions.

(8) If practicable, obtain a report of a staff ride and follow on a map the various operations detailed therein, working out a scheme for providing the necessary medical assistance to the force or forces engaged and providing for the fighting troops, the lines of communication, and the base.

Outdoors.

(1) Practise setting a map by the country, by the compass, and by the sun.

(2) Practise finding your position on the map by objects and by resection.

(3) Compare maps of various scales with the ground which they represent.

(4) Confirm practically the estimation of visibility of objects which has been deduced from a study of the map.

(5) Always obtain a map of the district in which you are stationed, and make yourself thoroughly acquainted with the surrounding country.

(6) When on manœuvres or on the march, study a map of the country you are about to pass through and try to form a mental picture of it. See how far your anticipations are realised by the actual appearance of the country.

United Services Medical Society.

TREATMENT OF SYPHILIS BY INTRAMUSCULAR INJECTION OF METALLIC MERCURY; NOTES ON MERCURIAL CREAMS, ETC.

By Staff-Surgeon H. C. ADAMS.
Royal Navy.

I AM deeply sensible of the great compliment that I have received in being asked to read a paper before the United Services Medical Society.

I propose to put forward a plea for the treatment of syphilis in His Majesty's Navy on a uniform basis, by means and methods which appeal to me as being the most suitable; I am convinced that the best results can only be obtained by Medical Officers working together on some definite scheme.

In the Navy up to the year 1898, as far as can be ascertained, syphilitic patients were almost entirely treated by internal administration of mercury in the form of pills and mixtures, inunction and fumigation being used as variants occasionally. At the present time these forms of treatment are carried out very largely by numerous medical officers, who are not conversant with the intramuscular method and technique.

In the Service there are, in my opinion, very grave reasons for abandoning the internal ingestion method.

I have carefully questioned many men who have been under my care at Haslar; the same statement is obtained time after time; men weary of continually visiting the sick bay so many times daily for their treatment and unless carefully checked off attendances become irregular.

It is a common practice for some men, when compelled to visit the sick bay regularly, to pretend to swallow the dose, but on leaving to expectorate it into the water-way. It is not many years since the leads outside some of the venereal wards at one of our large naval hospitals, on being swept after a period of dry weather, yielded a large dustpan nearly full of pills, which were supposed to have been swallowed by the patients.

Men detailed for working parties or other duties are unable to attend at the stated times, and on returning, perhaps tired out, forget, or deliberately neglect, to visit the sick bay for treatment.

It is of little use giving the majority of men tablets to carry with them, as very few, unless they have some active reminder of their disease, can be relied upon to carry out instructions, however clearly they may be given.

A great many men still firmly believe the old story that the taking of mercurial pills causes the hair to fall out; this tradition is supported by the following story. Several years ago at one of our naval hospitals some of the syphilitic patients experimented on fowls belonging to a storehouseman, by feeding them on mercurial pills, with the result that their feathers fell out.

It is not always convenient or possible for the medical officer of a ship to personally see that patients attend daily at the proper times; therefore he is at the mercy of the sick berth steward, who may or may not be thoroughly reliable.

I have seen patients admitted into hospital who were stated to have taken tablets so many times a day regularly, for in some cases very long periods. It is quite certain that in many cases, if the facts were as stated, the patients would have been severely salivated, instead of showing no signs of having been under mercurial treatment.

I am strongly of the opinion that the digestive system should not be required to carry the burden of continually dealing with mercurial pills, when the drug can be conveniently administered in other ways, thus obviating the digestive disturbances which are liable to arise.

Inunction does not appear to be a suitable general method of treatment afloat. Objections are many, especially in the case of men on the attending list:—

(1) Length of time required daily.

(2) It is dirty—soiling men's clothes; this means giving them extra trouble of washing and expense of buying clothes; also increased expenditure of fresh water, always a valuable item afloat.

(3) Unless personally superintended, and the rubbing done by a trained rubber, it is most unsatisfactory; even in hospital I have found it unsatisfactory unless personal supervision can be given; this, considering the number of patients under treatment, is practically impossible.

I now come to the method of treatment by intramuscular injection of mercury, which I should like to see universally adopted throughout the Service, and placed on a sound basis.

The efficiency of treatment would be greatly enhanced by the

provision of a syphilis sheet, on which would be recorded the necessary data concerning the treatment of each man's case. This is most necessary, as at present it is difficult to unravel accurately the line of treatment which has been followed in a great number of cases of some standing, which came under observation.

If any great success is to be achieved a definite plan of treatment and technique is essential. In the system that I have adopted, full advantage has been taken of any published matter on the subject to which I have had access, and especially the valuable data that have from time to time been brought forward by distinguished officers of the Royal Army Medical Corps.

When the first attempts were made to administer mercury in the form of intramuscular injections, partly owing to the unsatisfactory nature of the preparation—that used at Plymouth some ten or eleven years ago was simply made by rubbing down ung. hydrarg. B.P. with almond oil to a suitable consistency—and partly owing to faulty methods of administration, the treatment quickly dropped out of use. Although in a few chronic cases very startling and satisfactory results were obtained, it was considered that the dangers outbalanced the advantages. The use of mercurial cream was continued sporadically up to 1905; from that year it has been continually in use at Haslar. So satisfactory have the results become from improved preparations and methods of technique, that the use of the internal ingestion method has gradually decreased, and at the present time has almost ceased.

The formula started with in 1905, as found in old records, was :—

White vaseline	2·5 parts
Mercurial ointment	1·0 ,,
Mercury	19·5 ,,

Triturate hot, then add carbolic oil (1 in 20) 7 parts, and liquid paraffin 20 parts.

This was quickly followed by the following formula :—

Mercury	2 oz.
Lanoline	4 ,,
Liq. paraffin	8 ,,
Acid carbolic	4 per cent.

This was again replaced by :—

Mercury	1 oz.
Anhydrous lanoline	4 ,,
Liquid paraffin (carbolic acid 2 per cent.) .. ad	5 ,,

This being Colonel Lambkin's old formula.

On July 6th, 1906, a supply of cream, for issue to the Service afloat, was received from contractors. It proved very unsatisfactory

owing to the mercury not being sufficiently subdivided and the medium being solid, necessitating the cream being melted before use, hence the syringe and the needles choked, owing to cooling, before the injection could be given.

On January 29th, 1907, a supply of cream, made according to Lambkin's formula, was received from contractors to replace the first issue. Although cream prepared from this formula in the Haslar dispensary was satisfactory, the article supplied proved to be a very little improvement on that previously obtained. The mercury was not in a sufficiently fine state of subdivision, the medium was not workable in the syringe and needles, necessitating warming; this, unless very carefully managed, with continual stirring, caused the mercury to rapidly fall to the bottom of the bottle, rendering it quite impossible to give an accurate dose.

I have seen men sent into hospital showing signs of very active syphilis, with a fearful record of consecutive weekly injections of this cream; many had received fifteen or sixteen weekly injections of 1 grain of mercury, and one case had a record of thirty-six or thirty-seven injections, missing only one week in the series.

These men had only been receiving injections of fat, the mercury having fallen. Many partially used bottles of cream returned into store were found to have the whole of the mercury at the bottom, leaving practically an inert layer of the basis at the top. The specimens which I have here bear out this point.

This particular formula not being considered the best possible, attempts were made to improve it. The following were found to be the essential points in the preparation of a satisfactory cream for intramuscular injection :—

(1) The mercury must be in an extremely fine state of subdivision.

(2) The basis should be sufficiently fluid at ordinary temperature to work freely in the syringe and needle, and should be sufficiently viscid to completely suspend the metal.

(3) There should be no abrupt transition on warming from the fairly solid to the liquid state.

Various experiments were carried out with regard to the subdivision of the mercury; it was found that mechanically rubbing it down in a mortar with half its weight of pure anhydrous lanoline was the most effectual.

Cream, prepared from this paste, was placed in a tube and kept fluid for several days in an incubator; although the mercury accumulated at the bottom, the dark grey or practically black

deposit showed no globules visible to the naked eye and could be easily diffused. On cooling the cream was found to have undergone no deterioration by aggregation of the minute globules into large ones.

Various other creams, in which the mercury was not in such a fine state of subdivision, were experimented with in a similar manner; large globules formed at the bottom of the test-tube, and in some instances ran together to form a layer of fluid metal.

Many bases were experimented with in which the following materials were used: beeswax, almond oil, paraffin, lanoline, cacao butter, vegetable waxes, &c.; those containing waxes were found to be most unsatisfactory, they were generally solid at ordinary temperature, and on being melted became extremely thin and fluid, and although the mercury if in a sufficiently fine state of subdivision did not run into globules, it precipitated to the bottom of the bottle, making it extremely difficult even with vigorous stirring to keep the mercury uniformly diffused, and although some of the preparations on gradually cooling passed through a semi-fluid or viscid stage, the operation of re-melting, stirring, and waiting had to be carried out every time a series of injections had to be given and much time was unnecessarily lost.

After these experiments, the well-known lanoline and paraffin basis was again reverted to; it was found that by reducing the lanoline a satisfactory cream could be obtained. The following was the formula finally adopted and at present in use:—

℞	Mercury	20 parts	by weight
	Anhydrous lanoline	30 ,,	by weight
	Chlor. butol.	2 ,,	by weight
	Liquid paraffin	to 100 by measure	

This gave a cream containing 1 grain in 5 minims. Chlor-butol was adopted as an antiseptic and analgesic.

For over twelve months this preparation was made in the dispensary at Haslar with an ordinary mortar and pestle, and having been found by the results of practice in the venereal wards to be in every way satisfactory, it was decided that it should be issued to the Service afloat.

The quantities required rendered the making by hand impracticable. A special mill was installed in the pharmaceutical laboratory, being practically a large granite mortar and a heavily weighted pestle driven by power.

In actual preparation, redistilled mercury is purified by allowing it to flow in a thin stream through a long column of nitric acid;

the metal is then thoroughly washed in distilled water and filtered through chamois leather.

A particularly pure anhydrous lanoline is used, it is sterilized by heat and filtered. One part of lanoline is introduced into the mill and two parts of mercury are added gradually as the globules disappear, trituration is then continued until a small portion, on being examined under a microscope, shows the mercury to be in a sufficiently fine state of subdivision. From the paste so obtained, the mercurial cream is made by cautiously heating the paste in a porcelain dish with the additional proper quantity of lanoline, being finally diluted to the definite measure required with sterilized paraffin in which the chlor-butol has been dissolved. It is then strained through sterile white gauze and poured into bottles of 2-ounce capacity, in which form it is issued for use.

The specimens you see are:—

No. 1. The preparation made in the manner just described; it is very dark in colour and indicates thereby the very fine state of subdivision of the mercury. The intensity of the darkness of a mercurial cream bears a direct ratio to the fineness of the globules and is a good indication of its careful preparation.

With all waxes this fine division of the mercury is extremely difficult to obtain by trituration; lanoline has the property of "killing the mercury" as it is technically termed, in a very marked degree, probably owing to its sticky nature, which causes the globules to be drawn out or elongated under the action of the pestle, in much the same way as oil globules are drawn out and broken into smaller ones when preparing emulsions with an acacia basis; the peculiar "click" heard during the process of trituration being a sure indication that the process is proceeding in a satisfactory manner.

You will also notice that the cream is sufficiently fluid to work in the syringes and needles without being heated; there is but little tendency for the mercury to precipitate at ordinary temperature; in any case a slight stirring is quite sufficient to render the mixture uniform.

No. 2 is the cream which was first introduced for the Service afloat.

Nos. 3 and 3a are preparations made from the old formula introduced by Colonel Lambkin.

No. 3 represents the result arrived at in the dispensary at Haslar, the cream being made in a similar manner to the description just given for No. 1.

DESCRIPTION OF PLATE.

No. 1.—As now used in Naval Establishments and Service Afloat. Prepared at Haslar. 1 grain in 5 min.

No. 2.—Formula unknown. First cream issued for Service Afloat use. Supplied by a contractor. 1 grain in 10 min.

No. 3.—Colonel Lambkin's old formula. Prepared at Haslar. 1 grain in 10 min.

No. 3A.—Colonel Lambkin's old formula. Second cream issued for Service Afloat use. Supplied by a contractor. 1 grain in 10 min.

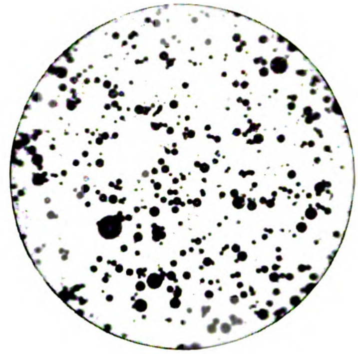
No. 4.—Sample of cream supplied by a London firm and stated to be from Colonel Lambkin's latest formula. 1 grain in 10 min.

No. 5.—Prepared at Haslar from formula in supplement to British Pharmaceutical Codex. 1 grain in 10 min.

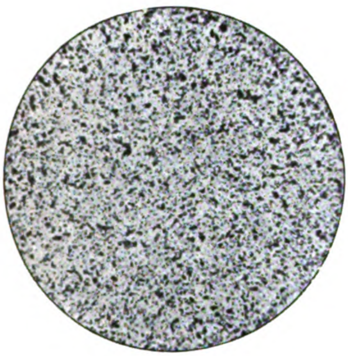
No. 5A.—Mr. R. R. Bennett's modification of formula in supplement to British Pharmaceutical Codex. *Pharmaceutical Journal*, February 12th, 1910. 1 grain in 10 min.

No. 6.—Sample supplied by another London firm from Colonel Lambkin's latest formula. 1 grain in 10 min.

No. 1



No. 2



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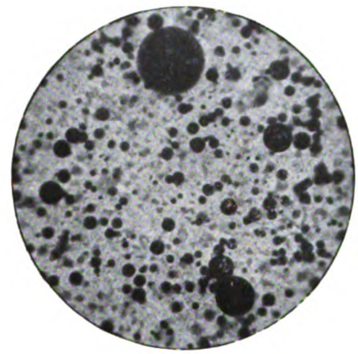

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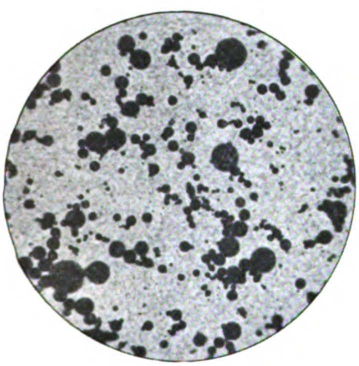

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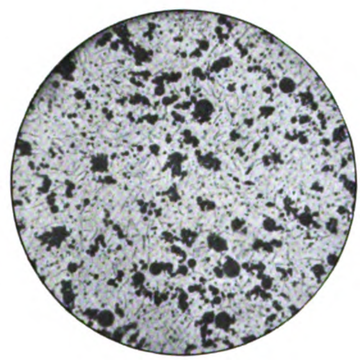
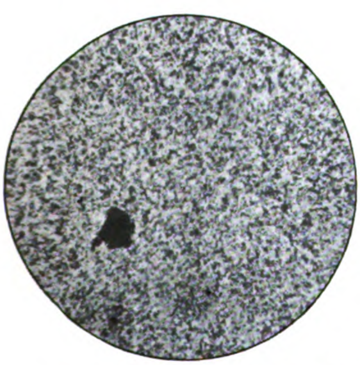
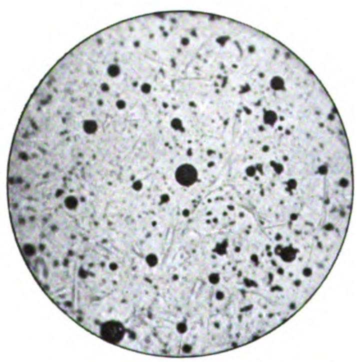


No. 5



No. 5A



No. 6

To illustrate "Treatment of Syphilis by Intramuscular Injection of Metallic Mercury; Notes on Mercurial Creams, etc." + 110.

No. 3a is the preparation as supplied by a contractor, and as the colour indicates, the mercury is not well divided and it is not workable at ordinary temperatures without warming.

No. 4 is a cream stated to be made according to Colonel Lambkin's latest formula. This cream was obtained from a well-known London firm of manufacturing chemists.

No. 5 is a cream made in the dispensary at Haslar with a Japan wax and almond oil basis. The formula was obtained from the "1908 Supplement to the British Pharmaceutical Codex." It is the best result we have been able to obtain with the formula.

No. 5a is a modification of No. 5 suggested by Mr. Reginald R. Bennett, Pharmacist to University College Hospital, in the *Pharmaceutical Journal* of February 12th, 1910.

The mercury is obtained in an extremely fine state of subdivision by reducing the metal from mercuric chloride with hypophosphorous acid before mixing it with the basis. A very satisfactory cream can be obtained by this process, but great care is required to uniformly distribute the particles of mercury, as they have considerable tendency to aggregate into small masses without actually running together into globules. The method is not applicable to preparing large quantities of cream, and the results obtained are not greatly superior to those produced by trituration with lanoline.

By varying the quantity of Japan wax in proportion to the almond oil, creams of various consistencies can be easily obtained; they all have a tendency to appear somewhat granular owing to the crystallisation of some of the constituents of the Japan wax.

No. 6 is from a cream prepared by another London firm according to Colonel Lambkin's latest formula.

The micro-photographs of these creams I now show you were all taken under the same conditions with a $\frac{1}{8}$ Ross objective, amplification 110.

No. 1 belongs to No. 1 cream—*i.e.*, the cream in use at Haslar and now issued to the Service afloat.

No. 2 belongs to the cream first introduced for the Service afloat as supplied by contractors.

No. 3 is the Haslar preparation of Colonel Lambkin's old formula.

No. 3a is the same formula as supplied for issue to the Service afloat by contractors.

No. 4. is a cream by a London firm, stated to be made according to Colonel Lambkin's latest formula.

No. 5 is a cream prepared at Haslar according to the formula in the "1908 Supplement of the British Pharmaceutical Codex."

No. 5a is from the modified formula of No. 5, prepared as suggested by Mr. Reginald Bennett.

No. 6 is from the cream prepared by another London firm according to Colonel Lambkin's latest formula.

In all the photographs shown, with the exception of those from creams with a lanoline-paraffin basis, distinct needle-like crystals of some of the constituents can, on careful examination, be seen; they are more distinct in the negatives than in the prints.

You will note the extreme fineness of the subdivision of the mercury in the photograph of No. 1, the Haslar cream, and in No. 3, the Haslar preparation of Colonel Lambkin's old formula; also in No. 5a, the latter shows one of the small aggregated masses of small particles of mercury which were found so difficult to get rid of.

So marked is the difference between the results obtained by the Haslar dispensary and contractors, that it seems almost impossible that the two creams, Nos. 3 and 3a, could have been made according to a common formula.

All these creams, with the exception of No. 1, No. 3, and No. 5a, will, if a small portion be carefully pressed between a microscopic slide and cover-glass, show "mirror points" by reflected light to the naked eye, from the large size of the globules of mercury.

With regard to the syringe used, after many attempts it was found that the type of syringe which I have here was the most generally useful; you will notice that it has no loose nozzle, also that this part is more stoutly built than usual, as this was the weak point in the syringes that were first used; with the loose nozzle, a certain amount of cream was apt to be forced out and lost in any but practised hands, owing to its tendency to slip out of the barrel, consequently there was the danger of inaccurate dosage. In practice it was found that the wastage of syringes was very extensive from the slender ends of the nozzles breaking.

The needles in the original syringes used were platino-iridium. The reason for using this metal is not quite obvious, since metallic mercury has no action whatever on steel; further, the method of manufacture of a platino-iridium needle is by bending round a narrow sheet and soldering along the seam. When using platino-iridium needles I have sometimes found this seam to be imperfect, allowing the cream to ooze along the needle track, which is highly undesirable.

The needles now adopted are of steel throughout, including the socket; these needles being solid drawn, there is no seam to leak; besides, they are cheap, so that six can be supplied with each syringe; they are easily introduced, and are not so liable to bend or get blunt.

Wastage of syringes can to a very great extent be avoided by not sterilising them by boiling. Sterilisation is effected by washing through with alcohol and keeping in 1 in 20 carbolic acid.

The routine for injection, as used at Haslar, is as follows: Patients are mustered, each bringing his bed ticket, on which is recorded in separate columns—Date, number of injections, weight, amount given, and by whom given.

Every man is carefully inspected, and, if found fit for injection, passes to a steward who washes the buttock with ether soap, then the patient, holding a pad over the part, passes to the surgeon, who injects the amount considered suitable; after injection another steward lightly massages the buttock, finally a third steward enters the amount given, and name of the surgeon making the injection.

The technique followed is very similar to that usually laid down in the text-books. A table is covered with sterilised towels wrung out in 1 in 20 carbolic acid; the cream is poured into a sterile gallipot fitted with a glass cover. The needles are placed in a porcelain dish, containing olive oil, standing in a closed steriliser; from the hot oil they are placed in a porcelain dish containing cold sterile oil (this is to ensure that the eye of the needle when filled can be kept clear); if the needle is hot, this is impossible. The syringe is charged, the needle adjusted, and filled to the eye; the bead showing is carefully wiped off, and the point of needle examined to ensure freedom from filaments.

It is most important to ensure that the eye of the needle is free from cream, otherwise some is apt to be driven into the layers of the skin, and give rise to superficial painful swellings, and the needle track is liable to be irritated and painful.

The syringe is held in the right hand between the thumb and index finger with the pads of third and fourth fingers resting lightly but firmly on the needle, thus giving support at the right time, *i.e.*, when the needle is penetrating the skin.

The proposed site for injection is examined to avoid old injection points. The needle is driven in smartly at right angles to the skin to the required depth, varying with individuals, then detached to ascertain whether the eye is by chance resting in a vessel; if blood exudes, another puncture is made. This point seems to me

to be a very important one, as several times I have seen blood exude rapidly from a needle, and twice it has come through so violently as to spurt up my arm—in these cases evidently due to puncture of an artery. This precaution probably saved a fat embolism.

The required dose is injected, then there is a slight delay in withdrawing the needle to ensure that exudation is complete, otherwise a small portion of cream might be drawn up into the needle track. No dressing is applied.

Injections are given weekly; the average number of injections given to men in a good physical state is six, of 1 grain each for the first course; $1\frac{1}{2}$-grain doses are now only given in exceptional cases. Men who are in a wasted condition from their disease, and men whose mouths are in a septic state are, as a rule, given only $\frac{1}{2}$-grain doses weekly.

No definite number of regular doses can be laid down; the number given, and the amount of each dose, must vary in accordance with the merits of each individual case, as obtaining the full physiological action of the drug is the point at which one aims, avoiding even the slightest over-dose, which is harmful to the patient.

Patients are discharged from hospital with a sheet stating the duration of time under treatment, the number of injections given, and dosage of each, with the date of last injection, and a statement of the man's weight while under treatment.

If it is considered that the full dosage for a course has been given, an interval of rest is recommended. The actual interval which should be allowed appears to me to be a difficult one to decide—it is impossible to lay down a hard and fast rule—as the rate at which a man eliminates mercury must depend very much upon his occupation; men employed in the stokehold must eliminate more quickly than men employed on the upper deck. The actual lapse of time between courses should, and must be, left to the direction of the medical officer, who is able to inspect and note the condition of each patient at short intervals.

The cream has been in use at Haslar for over two years, and has given most satisfactory results in the very extensive practice of the venereal wards.

The general type of syphilis contracted at Portsmouth is a severe one; all cases from the very slight to a case on which over 330 ulcers were counted have been treated with the cream with satisfactory results.

I have had the opportunity of continuing the treatment of a few patients suffering from severe syphilis for a considerable time to the great satisfaction of the patients themselves, who state that they prefer this method to the ingestion treatment. No trouble is experienced in getting the men to submit to this method, as they see the good results obtained in others.

The number of return cases to hospital is small; those that do return have usually had their treatment carried on by the ingestion method after leaving hospital.

In conclusion, I have to thank Mr. F. W. Hooper, the senior pharmacist at Haslar, for the very great assistance he has given me in unreservedly placing at my disposal the results of his great knowledge and experience in the manufacture of mercurial creams.

DISCUSSION.

Major A. P. Blenkinsop, R.A.M.C., after congratulating Staff-Surgeon Adams on his interesting paper, said that the efficiency of the treatment of syphilis by the intramuscular injection of mercury had been amply proved by the excellent results attained in the Army. During his recent tour through India, Burma, and the United Kingdom, he saw very few of those cases presenting the more severe symptoms of the disease which were so commonly met with among soldiers before this method of treatment was introduced; and in the majority of cases, when these cases were investigated, it was generally found that the course of treatment which had been recommended and usually adopted had been more or less widely departed from in the majority of them. The enormous reduction in the number of men invalided for syphilis from India and from our home army furnished further proof of the benefit of systematic and lengthy treatment. At more than one cantonment hospital in India, prostitutes who were admitted with syphilis were treated by intramuscular injections of mercury. These women fully appreciated the good effects they derived from the injections, and were anxious to continue them, even after discharge from hospital. In his experience the majority of patients showed very little fear of the needle, and many men after completing a two years' course said that they would like further treatment, if it were considered to be in any way necessary, It was most important to get the confidence of one's patients, who were generally quick to recognise the advantages of thorough treatment when it was explained to them that constitutional syphilis might not only affect their efficiency as soldiers, but also their prospects of being able to support themselves in civil life.

The calomel cream introduced by Colonel Lambkin was a valuable addition to our armamentarium in combating syphilis. Its action was rapid, and, in the majority of cases, the pain following its injection was

trivial. Its employment was specially indicated where the disease was making rapid progress, or where important organs, such as the eyes, were threatened with permanent injury or destruction.

How far a two years' course of intramuscular injections of mercury could be relied upon to eliminate syphilis was doubtful. Continental authorities almost universally recommended a longer period; but one had to take into consideration Service conditions, and the question presented itself whether under those conditions it was practicable to prolong the administration of mercury further as a routine practice. He was strongly of opinion that the course of treatment employed in the Army and Navy should be systematised, both in the interests of the patients and of those called upon to treat them. In the Services men were often moved from one station to another, and medical officers were liable to be changed. Unless some general system of treatment was recognised, and an accurate record of the progress of the case and the details of the treatment was kept, there was every likelihood of cases of syphilis being given too much or too little mercury, and evil results would follow in either case. While fully recognising that every case of syphilis must be treated on its own merits, he contended that the procedure adopted in the Army, of recommending a definite routine course of treatment for uncomplicated cases, was a sound one.

Major Pollock said: I am glad to find that Staff-Surgeon Adams, after making such an exhausted trial of various creams, has selected a strength of 1 grain of mercury in 5 minims, as this has always appeared to me to be the best working strength. With regard to the separation of the cream into an upper layer containing little or no mercury and a lower layer containing nearly all the emulsified mercury, this must take place when the cream is kept for any length of time at or near the temperature at which it becomes fluid. The separation can to a great extent be prevented by having a cream prepared which becomes fluid at 100° F.; in temperate climates this cream is usually solid and does not allow the mercury to separate it; when required for use it can easily be made fluid by standing the jar in a basin of warm water.

As to Colonel Lambkin's calomel cream, it is a very great advance on any calomel emulsion produced hitherto, it is not, however, always painless, and in two cases an abscess followed its use; the pus in both cases was sterile. Staff-Surgeon Adams did not seem to me to lay enough stress on the very great importance of testing the urine before and during a course of injections. I am convinced that all the fatal accidents which have so far occurred from the use of injections of mercury have been in men suffering from inflammation of the kidneys, and that had this fact been ascertained at the start the injections would naturally have been withheld. I have papers of *post-mortem* reports of five such cases, all of these support this view.

Fleet-Surgeon Bidwell said: Just now it is the fashion to extol

the use of injections instead of inunctions of mercury; opinion is equally and even somewhat bitterly divided between these two methods, and there is a tendency to attribute any bad results which may be met with to an insufficiently energetic exhibition of mercury. When I was a student, however, the new and enlightened method of treatment which was to rob syphilis of half its terror was the administration of very minute doses of mercury by the mouth. Bad cases of syphilitic cachexia, with deep ulcers and destruction of bone, such as were depicted in a very unpleasant series of wax models in the museum, they taught us were things of the past, and due to the too energetic treatment of a former day, and especially to what some of my teachers described as that barbarous relic of the Middle Ages—inunction. So much for inunction. With regard to injections, I have not myself had much experience of their primary effects; I understand, however, that these are sometimes uncertain, and that very alarming symptoms of mercurial poisoning have sometimes followed the administration of quite small doses. I think that the earlier specimens shown us by Staff-Surgeon Adams throw some light on this point. Of the remote effects I have had more knowledge. Fortunately, really very bad cases of syphilitic cachexia, with deep tertiary ulceration, are not very common in the Service, but every really horrible case of that description which I have met with in the Service has been treated with injections. I am quite positive on this point, though I am ready to admit that my experience may have been exceptional. But at any rate I am sorry to say that the experience of a naval medical officer in this disease is not inconsiderable. The lecturer mentioned that it is not unusual for men to shirk swallowing their pills, and told us of the discovery at Haslar of a large quantity of grey powder "tabloids" which should have been swallowed by patients. I agree that this is common, and when I suspect it I give one of the liquid preparations of mercury. I have found this quite satisfactory.

Captain Harrison said that if the Wassermann test was any indication of the value of a particular plan of treatment, and he was inclined to think it was, the treatment of syphilis by intramuscular injection of mercury seemed to give better results than any other method in use in the Army. He thought that the danger of a steel needle snapping was a very real one. It had occurred once in his own practice, and he had considered himself very fortunate that he was able to seize the needle and extract it by the minute portion of it which protruded, before it was entirely drawn into the tissues.

Clinical and other Notes.

THE ROYAL ARMY MEDICAL CORPS FUNDS.

By Lieutenant-Colonel E. M. WILSON, C.B., C.M.G., D.S.O.
Royal Army Medical Corps (Retired).

From many conversations with brother officers and also from the questions sometimes put at the Annual Meetings of the Corps, it appears that a good deal of uncertainty still exists as to the nature and scope of the Corps Funds, and I thought that perhaps at the present time, when we shall shortly be assembling together for the Annual General Meeting and the Dinner, a brief statement in the Journal as to the origin and present position of these funds might be acceptable, and stimulate the interest of some who do not subscribe, and of others who do subscribe, but do not know how, where, or in what way their subscriptions are utilised.

It is easy to understand why in many cases there is a certain amount of ignorance or indifference among busy men.

From time to time the meetings of committees are published in "Corps News" with rows of figures correctly balanced, but reports of committees like Blue-books are dry reading, and an officer is very apt to say: "I suppose it is all right! I subscribe so much a year and Holt does the rest." I think, with the exception of the pamphlet containing the first seven meetings of the committee, the facts have never been collected together and put before the Corps in one article, and it seemed worth while to try to condense the labours of many committees and sub-committees, and to summarise the growth and development of a movement of which the Corps may well feel proud.

The birth of the Corps Funds as they now exist dates from the close of the South African War, and for their initiation and subsequent organisation we have to thank Sir W. Taylor, who took the greatest interest in all the details during the whole time he was in office, especially in connection with memorials for distinguished officers, and in the provision of assistance for families of the rank and file.

For several years before the war in South Africa there had been small funds in existence working independently with separate committees. The Dinner Fund was founded in 1891 by Surgeon-General Don, still a member of the sub-committee; though I believe the Annual Dinner itself was of much earlier date. This was an arrangement by which annual subscribers of 5s. dined at a reduced rate, according to the amount of the funds in hand. For many years Lieutenant-Colonel J. Hector acted as the Honorary Secretary.

The Band Fund, founded in 1894, with which the name of Colonel H. Grier will always be connected, invited subscriptions of 5s. a year towards the maintenance of the band at Aldershot. There was also a small fund started in 1895 for the purpose of recording the names of deceased officers of the Corps in St. George's Church at Aldershot, and another subscribing to the Corps of Commissionaires.

For the provision of assistance to widows and orphans of N.C.O.'s and men, and for relief of the rank and file themselves when fallen on evil times, there was no organisation at all.

Trusting to the proverbial generosity of the soldier, appeals were made locally in sad and urgent cases; the hat went round and a sum was made up for the individuals affected.

This, though very creditable to the subscribers, could hardly be called satisfactory to the Corps as a whole. It imposed a heavy tax on localities and involved an immense amount of correspondence. One case I remember, connected with the late Mr. Bonny, who was a serjeant of the Corps with Parke in Stanley's Expedition for the relief of Emin Pasha, took almost as long to wind up as an estate in Chancery.

But with the South African War a new state of things came into existence and began to develop very rapidly, especially as regards Warrant and N.C.O.'s and men and their families. There was a general feeling throughout the country that something should be done for the wives and children of men of all branches of the army ordered on active service, and money began to flow in on behalf of the Royal Army Medical Corps, which has no territorial centre, from the medical profession, the Volunteer Medical Staff Corps (now Royal Army Medical Corps Territorial Forces) and other sources. This was at first banked at Aldershot and used for general relief, preference being given to women and children.

Later on considerable sums were received from South Africa itself, being profits from the canteens and institutes of the large hospitals. Some of these were given specifically for "widows and orphans," and one large amount was particularly earmarked for the "education of children." These sums were banked at Holt's.

The position thus became complicated. There was a committee at Aldershot dealing with general relief, including widows and orphans, considerable amounts at Holt's, some for general relief and others allocated for widows and orphans, or for schools for children, the existing small funds mentioned above dealing with the Band, the Corps Dinner, &c., and in addition there was a growing demand for some organisation to commemorate the services of distinguished officers of the Corps.

Under these circumstances Sir William Taylor issued a circular to the Corps on March 7th, 1902, in order to ascertain the feeling of officers with regard to a fund for perpetuating the memory of distinguished officers.

He received a very large number of replies in the affirmative, with many suggestions that the proposed fund should *also* embrace the Band, the Annual Dinner and other objects. A provisional committee was then appointed to consider the whole subject, and met on July 25th, 1902.

In this way the Royal Army Medical Corps Fund came into existence.

The committee passed the following resolutions among others: "That a permanent fund should be established and that it should include the Memorial Fund, the Annual Dinner Fund, and the Band Fund. Also that a general meeting should be held on the day of the Annual Dinner at which free discussion of all matters bearing on the fund should be invited."

Lieutenant-Colonel B. M. Skinner, M.V.O., accepted the post of Honorary Secretary and devoted an immense amount of time and labour towards getting the idea into a working shape.

Correspondence and suggestions rained in from officers all over the world, and it must have been a matter of the utmost difficulty to arrange and classify the replies received.

However, at the second committee meeting on December 16th, 1902, it was evident that the main principles were cordially approved; a permanent committee was then elected with automatic changes. The subscription was fixed at £1 a year, and an important resolution adopted to "take up the question of a compassionate fund for Warrant and N.C.O.'s and men of the Corps and their wives and families on or off the strength." This was the origin of the second fund.

The first Annual General Meeting of the Corps was held at the Royal United Service Institution on June 15th, 1903, and the action of the various committees approved. At the same time it was noted that the Journal had received official approval, and the first issue appeared in the following month. Reports of all subsequent meetings of the Royal Army Medical Corps Fund Committee and statements of accounts have since been published in the Journal; but, without going into wearisome details, it may be stated that gradually and carefully, with due regard to the wishes of individual subscribers to the former funds, and to contributions specially given for particular purposes, the smaller distinct funds with their separate committees have been absorbed, the main principle steadily kept in view being that there should be one Royal Army Medical Corps Fund for officers, including memorials, band and dinner; and one Compassionate Fund for Warrant and N.C.O.'s and men, including widows and orphans, schools and general relief.

As regards the Royal Army Medical Corps Fund, the Band and Dinner committees have become sub-committees of the fund, the former sitting at Aldershot, and the latter in London.

By a resolution of the general meeting in June, 1907, it was decided that "the annual subscription of £1 should be allocated by the committee

as considered most desirable." This was endorsed by a special representative meeting on July 12th, 1907.

In consequence of this decision, while the cost of the Dinner to subscribers has been kept at a low rate, it has been possible to make more liberal provision for the Band and yet to maintain a considerable balance for Memorials whenever required.

In proof of this it may be mentioned that the charge for the Dinner, which used to be 17s. 6d. or £1 to each subscriber to the old fund, has been reduced for the last few years to 7s. 6d., the Corps Fund paying the difference, and no doubt partly in consequence of this the number dining has increased largely, each year beating the record of the last, the total attendance being now well over 200.

More elasticity has also been gained in allotting grants to the Band according to requirements, which naturally vary considerably at different times. These grants, made quarterly, have averaged £90, so that the Band has received on an average about £360 annually for the last few years.

As regards Memorials, we have transferred the statue of our first Director-General, Sir J. McGrigor, from Chelsea to the College, completed our Victoria Cross Gallery, added to our portraits of Directors-General, founded prizes in honour of de Chaumont and Tulloch, and erected tablets, brasses, &c., in memory of several other officers.

At the close of 1909 the fund was nearly £1,500 in credit. Surely this is not a bad record for a fund only seven years old. Still there must be many officers both on the active and retired lists who, from lack of information or of interest in their own Corps, do not subscribe. In response to Sir W. Taylor's circular in March, 1902, 476 officers joined before the end of July. In the year 1904 this number had increased to 836, and in 1908 to 1,037, but last year our total only amounted to 1,070.

With an establishment on full pay of nearly 1,000, one would think that our list of members ought to grow to 1,500. If all officers on full pay and only half of those on retired pay subscribed, the larger number would be easily reached. It is an institution of which we should all be proud, and I hope our secretary may have more satisfactory figures to give us at the general meeting next June.

Turning now to the Compassionate Fund, the principle was laid down, as stated above, that there should be one Compassionate Fund for general relief, widows and orphans, and education of children; but time was required to carry this decision into effect, as large sums had been earmarked for special purposes.

The money specifically given for widows and orphans having been expended for that purpose in July, 1907, this fund lapsed as a separate account, and all payments have since been made from the general relief fund.

In October, 1907, the separate banking account at Aldershot was closed, the balance being transferred to Holt's. The local sub-committee consequently ceased, and all payments for all commands have since been made from London by the secretary.

The "School Fund," which originally amounted to nearly £1,400, is being utilised for this purpose only; £846 still remains, and when this has been expended all further charges for the education of children will be borne by the fund for general relief or compassionate fund.

It was also decided at the committee meeting on January 17th, 1908, that the annual subscriptions should be a first charge on this fund. These are the Union Jack Club at Waterloo, the Corps of Commissionaires, the National Association for the Employment of Reserve and Discharged Soldiers, the Soldiers and Sailors Help Society, &c., and for this purpose £1,000 was invested and the interest devoted towards the payment of these subscriptions.

Meanwhile, to meet the increasing calls on the general relief or compassionate fund, it is satisfactory to learn that the income has been steadily growing; the large sums received from canteens and regimental institutes in South Africa naturally ceased on the termination of the war. They were banked, placed on deposit, or invested, and are now being gradually expended; but the contributions from nearly all regimental institutes of the corps in commands at home and abroad are taking their place, and it is hoped that an annual income sufficient for all purposes will be maintained. The idea of asking regimental institutes and canteens of the corps to contribute to this fund originated from a suggestion of Lieutenant-Colonel G. E. Twiss at the Annual General Meeting, June 14th, 1904, and was at once cordially taken up.

A short statement of the amounts received from this source may be of interest:—

	£	s.	d.
1904	174	0	0
1905	189	0	0
1906	217	2	7
1907	319	5	0
1908	372	3	5
1909	376	5	8

(Average for the six years, £274 12s. 9d.)

It will thus be seen that the income has increased most satisfactorily; but it may be added that it will have still further to increase, as the Compassionate Fund not only provides general relief but also for widows and orphans, and will have to take over the education of children when the donation specially given for that purpose, which is still kept separate as the "School Fund," is exhausted.

The annual total expenditure of these funds, originally kept apart, is shown in the following table:—

		£	s.	d.	
1904.	All three Funds ..	530	1	5	
1905.	,, ,, ..	567	19	9	
1906.	,, ,, ..	634	12	9	
1907.	,, ,, ..	652	18	3	
1908.	General Relief and Schools	389	14	0	(Widows and Orphans separate fund exhausted.)
1909.	,, ,, ..	402	2	11	

(Average for six years, £529 11s. 4d.)

From the foregoing it will be evident that although every case is carefully investigated, and that since the donations specially given for widows and orphans have been expended the total amount has been considerably reduced; expenditure has a natural tendency to grow as deserving cases are brought forward and the Fund becomes more widely known.

No one would wish to put a limit to the valuable work which is being done, and it is hoped that for the present year our income may amount to, and be maintained at, £450 a year, so as to balance expenditure when the "School Fund" has been exhausted.

I should like also to say that the exact accuracy of the figures given above cannot be guaranteed, especially for the earlier years, although I have taken them very carefully from all the balance sheets. The fact of there having been several separate sets of accounts both in London and Aldershot, with payments to and re-transfers from one to the other, made it rather difficult. Also certain subscriptions, which were paid from income, are now, as stated above, paid from interest on capital, which makes a difference. Still I think, if the average income and expenditure are taken the figures are not far wrong, and since the separate Aldershot accounts have been closed the calculations are much simpler.

An important resolution regarding this fund was passed at the Committee Meeting on January 17th, 1908: "That the granting of regular quarterly allowances, which tend to become pensions, should be, as far as possible, discontinued, as inducing applicants to lean more and more upon the fund instead of making efforts on their own behalf, and that sums of money be voted for definite purposes, mainly with a view of recipients earning their own livelihood."

It was felt that otherwise the fund would gradually be absorbed by pensioners, and its sphere of usefulness as a fund for general relief greatly restricted.

The effect of this resolution appears in the reduced expenditure in 1908-1909, and I think it will be generally agreed that with the limited amount of money at the disposal of the committee the decision was a wise one.

The principle was also adopted at the Annual General Meeting on June 15th, 1908, that "a grant be made annually from the Royal Army Medical Corps Fund by the Annual General Meeting to the General

Relief (Compassionate) Fund, such grant to be determined by the state of the finances at the time."

By this means officers will feel that they are supporting a fund which otherwise derives its income mainly from the contributions of regimental institutes, &c.

For the years 1908-1909 the sum of 10 guineas was voted, as capital still remains unexhausted, but as time goes on and larger sums are required it is probable that future Annual General Meetings will increase this grant, in order that the usefulness of the Compassionate Fund may not be impaired.

I have endeavoured to bring together the principal facts relating to the gradual growth and development of these two funds in a way that might be interesting to the Corps, without going into dull and tedious details.

Our progress so far has been good, but personally I do not think we should rest satisfied until, first, we have 1,500 regular annual subscribers to the Royal Army Medical Fund ; and, second, we have a regular income of £500 a year for our Compassionate Fund.

These subjects have been referred to by Sir Alfred Keogh at each of the Annual Meetings at which he has presided, and, I believe, if all officers and all ranks of the Corps would exert their influence, these two ideals could easily be realised.

THE TREATMENT OF SYPHILIS AT THE MILITARY HOSPITAL, ROCHESTER ROW.

By Brevet-Colonel F. J. LAMBKIN.
Royal Army Medical Corps.

In the *British Medical Journal* of November 11th, 1905, there appeared a paper by me in which I gave an epitome of 3,200 cases of syphilis treated by the intramuscular method, which involved over 60,000 mercurial injections, not one of which was followed by any ill-effects.

I wrote that paper in the hope that perhaps it might help to dispel the prejudice which undoubtedly then existed among the profession in this country against the intramuscular treatment. That this prejudice still exists is, unfortunately, only too true, and accounts for the backward state of the treatment of syphilis among the civil population of England as compared with that on the Continent and in America. This prejudice is founded on a dread of certain accidents and ill-effects which are supposed to follow the injections, the idea having been mostly engendered by the writings and teaching of persons who have had little or no personal experience of the method in question.

Some little time ago I met a distinguished American surgeon who had just finished a tour of the various syphilis cliniques on the Continent,

and he was astonished to find that, whereas on the Continent the intramuscular method had become almost universal, in England it remains a dead letter—at least, as far as the civil population is concerned.

MILITARY HOSPITAL, ROCHESTER ROW, S.W.
From November 1st, 1908, to December 11th, 1909.

Disease	Admissions	Average number of days in hospital	Remarks
Syphilis ..	342	27·70	Includes Free Patients, Metropolitan
Gonorrhœa ..	407	27·37	Police, &c., besides Regular Troops.

Total Number of Injections given = 3,754.

Forms of injection	Mercurial	(1) Calomel (2) Metallic mercury	1,755.	Arsenical compounds	(1) Arsacetin (2) Orsudan (3) Soamin	1,529.	Atoxylate of mercury	470

No case showed any toxic trouble, nor were there any accidents or ill-effects of any kind during the year.

Gonorrhœa	Average number of days in hospital under—	Old System of irrigation.. ..	35
		Ballooning system	23

Number of Intramuscular Injections given at Rochester Row since it has been converted into a Venereal Hospital.

Year		Number of injections	
1906	..	7,000	Mercurial.
1907	..	2,417	
1908	..	2,733	Mercurial and arsenical compounds.
1909 to 11.12.09	..	3,523	
Grand total*	..	15,673	

* Among these the only untoward results were two small abscesses.

That the dangers which are supposed to attend this particular method are exaggerated beyond all measure is known to all who have had any experience of the matter, and, if any other evidence is necessary to refute them, the following table will prove useful. These statistics are taken from official records, and are uncontrovertible. As will be seen from the table, during the year since the opening of the reconstructed hospital at Rochester Row 3,776 injections have been given, these consisting of mercurial preparations and arylarsonates, and also of atoxylate of mercury. The mercurial preparations used were calomel and metallic mercury, of which 1,755 injections were given in the form of the following creams:—

Equal parts of absolute creosote and camphoric acid	Hydrargyrum, pure ..	10 grammes.
	Creo-camph.	20 cc.
	Palmitin, basis to.. ..	100 cc.

10 m. equals 1 grain of metallic mercury.

Equal parts of absolute creosote and camphoric acid	Calomel	5 grammes.
	Creo-camph.	20 cc.
	Palmitin, basis to.. ..	100 cc.

10 m. equals ½ grain of calomel. The melting point of both creams is 37° C.

For the purpose of suspending the mercury, as also for injection purposes, nothing could be better than the consistence of creams, and, owing to their painlessness, they enable calomel to be given with impunity, which, needless to say, is an untold advantage when intensive treatment is desired.

With regard to the arsenical compounds used, they consisted of arsacetin, orsudan, and soamin, all of which were given in solution. Of the three, I much prefer arsacetin, as it has the great advantage over orsudan and soamin in that it does not decompose in solution as these do if kept longer than twenty-four hours. Unless used fresh they also cause dangerous toxic effects, and I have very little doubt that the omission to make the solution up fresh before using for injection purposes has been the cause of most of the toxic cases reported. All three arsenical compounds were given in doses of 10 grains every alternate day until a total of 100 grains was reached. Not one instance of toxic effects occurred.

When it was first suggested to treat syphilis by means of the arylarsonates it was thought dangerous to combine them with mercury, as the latter was supposed to disassociate the arsenical preparations, leading to toxic poisoning; hence our custom at Rochester Row was to allow at least a fifteen-days' interval to elapse between the ending of one line of treatment and the beginning of the other. However, in the course of clinical experience, I came across certain cases of syphilis which, whilst resisting either mercury or arsenic when employed separately, rapidly gave way to a combination of both, and in a paper which I read at the meeting of the British Medical Association at Belfast last year, I said it was my growing conviction that a method of treatment containing both these metals would eventually be found to be the best. The combination which I first tried was to give the weekly injection of mercury during the time the patient was undergoing his arsenical course; but since last August I have been using a preparation of mercury and arsenic made by Messrs. Griffe and Company, of Charlottenberg, Berlin, the original manufacturers of atoxyl. They have named the preparation "atoxylate of mercury," and describe it as the acid salt of atoxylic acid. It contains 23·7 per cent. arsenic and 31·8 per cent. mercury; it is a white powder, practically insoluble in water, contains no water of crystallisation, and shows a slightly pinkish tinge when heated to 100° C. Its solution does not precipitate albumin, as is usual with other mercurial compounds; if heated in a test-tube over a direct flame it decomposes, aniline is given off, and mercury deposited on the side of the glass.

Being a proprietary drug, it is of course impossible to say of what its actual constituents consist, but this I will say, that, as far as removing symptoms and preventing the occurrence of early secondaries, our experience of it at Rochester Row is more than favourable. Even when intensive action is called for it compares favourably even with calomel.

The salt, being insoluble, is used for injection purposes suspended in olive oil, liquid paraffin, or, as I have it made up, in the creo-camph. and palmitin basis, when it is quite painless. So far in the course of close upon 500 injections of this preparation I have not seen a single case showing toxic signs. I give ¾ grain on the first day, repeat it on the third, after which a weekly injection of 1½ grains is given, until a total of eight injections have been given.

In certain selected cases inunction is resorted to, and when done is carried out very thoroughly—in fact, *à la Aachen*. As a mode of administering mercury there is none better than that of inunction when "properly" done, but unfortunately it requires specially trained rubbers and the personal supervision of a medical officer to secure its being efficiently done, for which reason it is palpable that, except as an exceptional measure, this line of treatment will never become a routine one. Inunction is no doubt advocated by some in preference to all other methods, and in doing so they speak of it as if it were free from the many drawbacks which beset it; but I cannot help thinking that these advocates are thinking more of the inunction method as it is carried out in England than of the way it is done at Aachen and Wiesbaden. Comparing inunction with injections as a routine method of treatment, all that can be said is that the latter is feasible, whereas inunction is not.

A PLEA FOR SHORTENING THE PERIOD OF CONFINEMENT TO BED AFTER ABDOMINAL OPERATIONS.

By Major F. J. W. PORTER, D.S.O.
Royal Army Medical Corps.

The prevailing custom of keeping patients confined to bed for a period of three weeks appears unsound.

In the Service, the most common abdominal operations are those for the removal of the appendix and the radical cure of hernia. As regards the first operation, it is usually done through a skin incision not exceeding 2 inches in length, close to the anterior superior spine, and the muscles are split in a direction parallel to their fibres. The abdominal wound is closed in layers, and some lasting material, such as kangaroo tendon or silk, is generally used.

In the case of the radical cure of hernia, the sac is stripped up as far as the internal ring, ligatured, twisted, pulled up through a hole in the internal oblique, and sutured in the twisted position. The canal is narrowed when necessary, and the superficial structures are securely sutured by a lasting material, care being taken to tighten up the external oblique by rolling it in. The great majority of patients are able (if permitted) to sit up on the third day, and they experience no pain or

discomfort in their wounds. Old traditions die hard, but it would appear that strain or damage would evidence itself by pain and discomfort.

During my last tour at Colchester, over 150 removals of the appendix were performed. At first one kept every patient in bed for three weeks. The men became very discontented after the first week, and their general health certainly was not improved by such confinement. I then gradually shortened the period, and seeing no ill-results, eventually let them all get up all day on the eighth day after the operation.

Shortly before I left, I operated on a lady for appendicitis. She was up on the sixth day, and walked two miles on the fourteenth.

Lately I operated on a healthy girl of fifteen years for chronic appendicitis. She sat up in bed on the third day, and got out to have her bed made. On the sixth day she sat in a deck chair for twelve consecutive hours. She walked about after the seventh day, and rode her bicycle at the end of the third week.

Under such a plan of treatment, the muscles, especially those of the back and legs, do not waste, as they certainly will do if not used for three weeks, and no time is lost in convalescence.

As regards hernia, I see no reason against a similar line of action. If one can depend on the strength and lasting properties of the suture material one uses, and the patient refrains from trying to lift weights for at least three months after the operation, there can be no risk in allowing him up even before the sixth day.

There is another fallacy which also requires exploding. I refer to the custom of not allowing *ordinary patients* to turn themselves in bed for several days after an abdominal operation. It hurts a patient far less to allow him to turn himself over in bed, than if he is seized by the hips and shoulders and turned by a nurse. In the former case, he instinctively keeps the damaged section of his abdomen quite rigid, and the absence of pain during the movement is, I think, a proof that no injury is being sustained.

APPENDICITIS—WITH THE RESULTS OF FORTY-FIVE CONSECUTIVE OPERATION CASES.

By Captain J. G. CHURTON.
Royal Army Medical Corps.

In order to adopt some sort of order, I will begin with the series of cases of appendicitis operated upon during what is familiarly termed the intermediate stage or quiescent period. That this is the stage *par excellence* at which to operate I think everyone will agree. The importance, however, of endeavouring to tide patients over the acute stage is what I would wish to emphasise. Of course I am fully aware that there are times when operations during the acute stage must be undertaken—

often in order to save the patient's life; still I cannot help being more and more convinced that these cases are fewer than most of us think, particularly amongst hospital patients, where an operation can be undertaken at almost any minute, and where in the meantime continuous observation can be maintained and carefully organised treatment carried out. Formerly the operation question was not sufficiently considered; now I think this point is perhaps too much in evidence, to the detriment possibly of the—so to speak—medical treatment of the case. It is by no means sufficient just to wait and watch for operative indications; quite a lot can be done which will not only lessen the possibility of having to operate during the acute stage, but, if an operation during that stage has to be undertaken, will allow it to be done under much more favourable circumstances.

The above remarks are based upon what might be spoken of as cause and effect. In the first place, What is the etiology of appendicitis? A certain number of cases undoubtedly are due to foreign substances finding their way into the appendix, but these are distinctly exceptional. By far the majority of cases are, I believe, due to a condition in the intestines —the cæcum in particular—of food decomposition, with a resulting increased activity and virulence of micro-organisms, principally of the colon, streptococcus, and staphylococcus groups; a condition probably arising from errors in dietary, possibly an excessive intake of animal food-stuffs. So much for the cause; as to the effect of treatment borne out upon such an hypothesis, I can only say that the results, in my experience, have justly warranted such a view. In brief, the line of treatment I adopt is to remove the infected contents of the intestines—a procedure which is distinctly opposed to the older methods, where opium and other similar drugs were administered; withhold for a time food, except albumin, water and such-like fluids, which are absorbed probably long before they reach the infected area; encourage leucocytosis by administering salines, and applying, locally, fomentations; and finally discourage the tendency to upward spread of the inflammation by posture.

Of interval operations there were seventeen, sixteen of which require no comment; beyond that they all healed by first intention, and were uncomplicated as far as after results were concerned. Some of the operations were easy; others very diffi ult and tedious, owing to extensive adhesions. The one case which did not do well was fortunately amongst the first of the series—I say fortunately because I think I solved the problem, and thus early was able to take steps to prevent its possible recurrence—namely, an infection of the peritoneal cavity at the time of cutting off the appendix, which I did then with scissors, and now do with the cautery paquiline, completely removing this danger. As to the other steps of the operations, I invariably used the gridiron incision, extending into the sheath of the rectus muscle when more room was required; I then

clamped the base of the appendix, ligaturing it and its mesentery, afterwards removing the appendix and invaginating the stump with a purse-string stitch. With regard to the time of operating—fourteen days for the milder cases and three weeks for the severe ones, after the complete subsidence of all symptoms—was the principle on which I worked.

The next series of cases—four in all—were those that were operated upon within a few hours of the onset of the attack. They all did as well as the sixteen interval ones, and provided that one can be sure that the case is in an early stage, I do not think there is any more risk. The operations themselves were conducted on similar lines.

The next were those in which operations were undertaken at different stages during the height of the disease, either because the cases appeared to be those of the fulminating variety, or because severe complications had, or were, commencing to take place—such as spreading peritoneal inflammation. The appendix in nearly all these cases was either gangrenous or perforated. They were without exception first attacks, as far as one could ascertain, which is what one would expect, and would account for their not remaining localised. After one or two attacks the disease is much more likely to remain centralised, owing to previously formed adhesions; consequently an operation, if undertaken, is either done in the late stage or during an interval. The symptoms in these cases which lead to operative interference may be classified as follows: Firstly, those which set in from the beginning with great violence—severe general abdominal pains, marked tenderness, rigidity and diminished movement of the abdominal muscles, sometimes vomiting, and a fairly high temperature and rapid pulse; all these symptoms tending to get worse instead of better. With regard to the diagnosis, there was always some little additional localising tenderness or rigidity, sufficient to make one more than suspicious as to the nature of the disease. These are the cases I have mentioned as being fulminating, and in all of them there was necrosis and sloughing of the appendix. In one case the necrosis had actually extended to the cæcum. There were altogether seven of this variety, in all of which I removed the appendix and put in drainage. The patients eventually made good recoveries.

A further series of fourteen cases differed from those I have just mentioned in that they—during the early stages of the disease—did not exhibit that extreme acuteness of symptoms; it was necessary to operate, either because of the apparently spreading inflammation, indicated by the extension of the tender area, an increase of the rigidity, and further limitation of abdominal movement, together with an increased rapidity of the pulse-rate, or on account of a sudden onset of excessive pain over the region of the appendix, often accompanied by some collapse, pointing to a probable perforation. In all the later cases of this series the appendix was removed, and the peritoneal cavity drained. In some of the early

ones, drainage alone was resorted to, and though all ultimately did well, I am now of opinion that more of them might have stood the extra time necessary to find and remove their appendices—a proceeding which would not only have shortened their stay in hospital, but would have prevented the necessity of a second or even of a third operation, which ultimately had to be performed on some of these cases.

At this stage I would like to say a word or two about the after-treatment of cases operated upon in the acute stage, which is almost more important than the operations themselves. Most of them suffer from collapse and shock, owing, I think, to the fact that their systems have already been weakened by toxæmia; on this account I therefore—in addition to applying warmth, hot blankets and bottles, and sometimes bandaging the extremities—administer normal saline solution, either directly into a vein, when the necessity is urgent, occasionally commencing before the operation is completed, or into the tissues, or into the rectum, sometimes combining the two latter. As improvement takes place, I have them slowly propped up, until they ultimately assume nearly the sitting posture. If there is restlessness they have a small dose of morphia, which usually brings about a restful sleep, after which I commence giving one-grain doses of calomel; and until the bowels have acted satisfactorily they are allowed only warm water and albumin water by the mouth. The saline injections are often continued for several days.

There now only remain three cases which must be classified by themselves, and might be spoken of as chronic appendicitis, as they never assumed acute symptoms, nor would they clear up under medical treatment. The first turned out to be tubercular in nature. The whole appendix, and to a lesser extent the cæcum, was thickly studded with tubercle in the form of miliary nodules, and there was a small amount of localised, clear fluid. After removing the appendix everything appeared to clear up. The second case had a somewhat thickened appendix bound down by adhesions. This patient also got quite well after excising his appendix. With the last of my so-called chronic cases I was less fortunate. In this, after waiting until well into the third week, in the hope that the symptoms would clear up, I decided to operate, removing an appendix which was very adherent and connected with a small abscess. In spite of this, however, the temperature disturbance continued, and instead of the pain remaining in the appendix region, it extended upwards to the liver, which became very tender. The patient now got gradually worse. On several occasions I explored the liver, but without hitting on anything. Ultimately he died, and at the *post-mortem* examination a number of small abscesses were found in the liver.

A FATAL CASE OF COCAINE POISONING.

By Captain A. D. JAMESON
Royal Army Medical Corps.

Corporal S., was admitted suffering from a urethral fistula, secondary to a stricture of the urethra, which was situated 3 inches from the urinary meatus. An attempt was made to dilate the stricture with metal bougies, but it was found to be very sensitive. Four days later another attempt was made to pass a bougie, after a little of a 10 per cent. solution of cocaine had been injected into the urethral orifice with a glass syringe, the urethra being compressed between the finger and thumb of the operator behind the stricture. The solution of cocaine was not retained in the urethra, but was allowed to escape immediately the syringe was removed. After five minutes the stricture was found to be still sensitive, and some more cocaine was injected in exactly the same manner as on the first occasion. Three minutes later whilst the stricture was being actually dilated the patient was noticed to have a very bad colour, and almost immediately he had a convulsion which lasted about half a minute. The pupils were widely dilated, the pulse imperceptible, and the forehead covered with sweat. Artificial respiration was commenced at once, strychnine and brandy were injected, and an electric battery was used, but the patient never rallied.

A *post-mortem* examination was made, but nothing of importance was found except a few cauliflower vegetations on the mitral valve, which, however, acted perfectly.

The solution of cocaine had been in use for a fortnight. The amount of cocaine retained in the urethra must have been very small, as the walls of the urethra are naturally in contact, and only separate to form a canal when distended with fluid under pressure, and come together again as soon as the pressure is reduced, which would happen in this case as soon as the syringe was withdrawn.

In Dixon Mann's "Forensic Medicine" there are two cases quoted of sudden death from the injection in one case of a drachm of a 4 per cent. solution, and in the other of 20 minims of a 4 per cent. solution of cocaine into the urethra. These two cases were the only ones in which toxic symptoms occurred in a series of several thousands.

In the *British Medical Journal*, October 6th, 1906, C. B. F. Tiby, M.B., B.Ch., reports a case of sudden death after the injection of 30 minims of a 10 per cent. solution of cocaine into the urethra. In the *British Medical Journal*, September 28th, 1895, J. H. Marsh reported three cases which had dangerous toxic symptoms from injecting 20 minims of a 10 per cent. solution of cocaine into the urethra.

Most authorities state that a 20 per cent. solution of cocaine may be swabbed on a mucous membrane, and in Caird and Cathcart's surgical

handbook it is stated that 2 drachms of a 5 per cent. solution may be injected into the urethra with safety.

Captain Irvine, R.A.M.C., informs me that he was present at a fatal case of cocaine poisoning, when a small amount of a 10 per cent. solution of cocaine was introduced into the urethra to facilitate the use of an urethrascope.

I have for years been in the habit of applying 10 per cent. solution of cocaine to mucous membranes for small operations, and have never before seen any toxic effects whatever. I should be glad to have the experience of my brother officers.

A PLEA FOR THE EMPLOYMENT OF AURISTS IN CONNECTION WITH RECRUITING.

By Lieutenant-Colonel R. C. COTTELL.
Royal Army Medical Corps.

Having the opportunity of seeing the medical documents of invalids that pass through the hands of the Chelsea Commissioners at the Royal Hospital, I have been struck by the frequency with which "deafness" has been a cause of invaliding, and also by the very short service of the invalids with this disability. I therefore thought it would be instructive to take the fresh cases of invaliding for all diseases that came before the Commissioners during the first three months of 1909 and note the comparative frequency of invaliding for "deafness" for that period.

I give a summary of my results:—

Between January 1, 1909, and March 31, 1909, 743 fresh cases of men invalided from the service came before the Chelsea Commissioners. Of this number sixty-two were invalids for "deafness." Two of them were long service men of sixteen and eighteen years respectively.

The average age of the remaining sixty men when invalided was 21 years, 8 months, and their average service two years and five months. The number under one year's service was ten. In eighteen cases the ear trouble was stated by the men to have been noticed "from childhood," and in addition to these eighteen cases, seventeen gave a fairly good history of the disease before enlistment.

This leaves twenty-seven cases as probably arising after enlistment. Of these twenty-seven cases, three were said to be due to bathing; two were said to follow malaria; in seventeen no cause could be suggested; four were said to be due to injury (two to "blow on the head," one to "rifle discharging" and one to "fall down a hatchway"). Of the long service men, one was said to be due to "malaria," and in the others no cause could be suggested.

In thirty-seven cases both ears were affected, in ten the right, and in fifteen the left only. There was discharge from the external meatus from

both ears in twenty, from the right ear only in fourteen, and from the left only in eighteen. In twenty-two there was perforation of the tympanic membrane in both ears, in thirteen in the right only, and in seventeen in the left only. In seven deafness was very marked without either discharge or perforation.

Note.—Forty-eight of the men were infantrymen, twelve cavalrymen, and two garrison drummers.

Such short service as these men have given in return for their expensive training is obviously a very bad investment for the State. I think when the facts given are thoughtfully considered, my brother officers will agree that a remedy is much needed.

I am of opinion that more care must be exercised in testing the hearing of the recruits and in examining their ears with the auroscope—which should be invariably used—and in all cases of doubt they should be seen by an aural specialist. If there are many of a doubtful character more aural specialists may have to be asked for, but, if the remedy would even halve this terrible loss, the time and money would be well spent.

FRACTURE OF CERVICAL VERTEBRÆ FROM AN UNUSUAL CAUSE.

By Captain V. G. JOHNSON.
Royal Army Medical Corps.

The following case being of a very uncommon character, I thought it might interest some of my brother officers if I published a few notes regarding it.

Private E. was admitted to the station hospital, Peshawar, at 1.30 a.m. on August 13th, 1909, with the following history: About 11.30 p.m. the previous evening, he and several other men visited the regimental swimming bath. Private E. dived in, and as he did not come to the surface again, two of his companions dived in after him and brought him up from the bottom of the bath in an unconscious condition. When seen in hospital he was found to have fully recovered consciousness, but was unable to give any account of what had happened, stating he remembered nothing after diving into the bath. There was complete motor and sensory paralysis below the level of the third rib. Both arms were partially paralysed; he was able to flex the forearm and slightly raise the upper arm, but was unable to extend either at all. The symptoms pointed to involvement of the whole of the brachial plexus, except the musculo-cutaneous nerve; the sensory fibres of this nerve were also apparently caught. He complained of acute pain on pressure or movement, at the back of his neck, at the level of the fifth cervical vertebra. He also complained of pain in his left shoulder. There was no sign of swelling or external injury at either of these spots, nor, in fact, on

any part of his body. His pupils were equal and slightly contracted, both reacted to light. Breathing was rapid and laboured, the diaphragm and muscles of forced inspiration (the pectorals excepted) alone working. The pulse was 80; temperature normal. During the night he passed a motion under him in bed. The patient was placed flat on his back in bed and an ice-bag applied to the back of his neck.

In the morning an attempt was made to obtain a skiagram of the cervical region, but owing to the patient not being able to be moved, for fear of causing further injury, the resulting plate was very indistinct and nothing could be made out. Screening showed nothing. The question of operation was considered but abandoned, as it was not thought that the patient could stand an anæsthetic, his breathing being now very difficult. He complained of a choking sensation in his throat and inability to get his breath. Loss of sensation had now extended to just above the second rib, but he was still able to raise his arms. His temperature had risen to 102·5° F., and his pulse was 102. Persistent priapism was present, he also had retention of urine, a catheter being passed and 8 ounces of urine withdrawn. At 12.30 p.m. he became very cyanosed and breathing ceased, artificial respiration was resorted to, but without avail.

Death was apparently due to ascending paralysis, affecting the respiratory nerves. Pressure from hæmorrhage into the spinal canal was considered most likely, the primary cause being possibly fracture or partial dislocation of one of the cervical vertebræ and crushing of the cord. The sudden onset of paralysis after the accident rather pointed to this; though the absence of all external signs of violence made it difficult to believe that so much injury had been done.

Post-mortem examination showed that the fourth and fifth cervical vertebræ were both fractured, the laminæ on either side the spinous process being broken through in each case. No displacement of the fragments had taken place. On removal of the fractured portions a good deal of dark-coloured blood escaped from the spinal canal, its origin probably being the longitudinal vein or one of its branches. No bruising or laceration of the spinal cord had occurred. No other lesion was discovered in any part of the body.

PERSONAL EXPERIENCE OF SPINAL ANALGESIA.

By Captain J. DORGAN.
Royal Army Medical Corps.

On November 29th, 1909, I was operated upon at the Queen Alexandra Military Hospital, London, for radical cure of a right inguinal hernia. I walked to the theatre, and was directed to lie on my right side on the table, with knees well drawn upwards and lumbar region arched. I received

the injection in the space between the second and third lumbar spines. I felt the slight prick of the needle in the skin, and after waiting anxiously for the further introduction of the needle into the spine, from which I expected pain, I asked the operator to let me know when he was about to inject the stovaine, I was agreeably surprised to hear that it had already been done some time previously.

I felt no unusual sensations for a minute or two, when I began to feel that a warm glow was spreading down the right leg, accompanied by a sense of tingling and a feeling as if the leg was becoming swollen by an increased flow of blood to the part.

Within five minutes after the injection I was being tested as to sensibility by pins. A pin-prick in the third lumbar area on the right side was only felt as a pressure, as if pressed upon by the finger-tip, whilst immediately lower down the right leg the point of the pin could be definitely felt as such; this loss of tactile sensibility rapidly passed down the leg until it reached the toes, and at the time when a pin-prick was no longer appreciated, I could still move my ankles and toes. The left side and leg, which, so far, were uppermost as I lay on the table, were at this stage only affected to a slight extent.

After about six minutes my right leg felt quite heavy and congealed and immovable, and anæsthesia was absolute. I was then turned on my back, and the operation was commenced about ten minutes after the injection. Somewhat the same sensations now began to develop in the left side and leg, but the effect on this side never appeared to be so complete as on the right side.

I did not know when the operation was begun, and was only able to guess the time by the sound of the forceps and the movements of the operator.

The skin incision caused a slight feeling of pressure in the region of the left inguinal canal. Throughout the operation any sensation seemed to be referred more to the left side than to the actual site of the operation. I had a slight consciousness that the cord was being touched during the time when it was being actually manipulated and dragged upwards from the wound. About this time I was asked to cough, and when I did so, it felt as if my abdominal contents were being forced down on to a semi-congealed and solid mass in the pelvis.

When the conjoined tendon was being stitched to Poupart's ligament, I had a very distinct feeling with each stitch that the surface of the skin over the spleen was being pressed upon as if by a warm body; I was not convinced that the feeling was unreal until I placed my own hand over the part. When Poupart's ligament ceased to be stitched, the sensation was no longer felt.

The upper extent of the anæsthesia reached to the eighth dorsal segment, and sloped downwards with the line of the intercostal nerves.

It ceased absolutely abruptly, so that on one side of a zone half an inch wide a pin-prick was definitely felt, whilst on the other side it conveyed an indefinite sense of pressure only.

Towards the end of the operation, about forty minutes after the injection, sensation appeared to be returning. I first felt as if the part was being lightly irrigated by a stream of tepid water. (There were no fluids used throughout.) As each of the superficial stitches was being passed, I felt as if each stitch was being forced through with an extremely blunt instrument. The sensation was not a painful one, but now for the first time it was referred to the actual site of the wound.

During the whole time of the operation I felt not the least pain, nor was I conscious of the least constitutional effect of any kind; my pulse remained normal; I chatted with those around as if I had been assisting at the operation on another person. Though the direct view of the operation was shut off by a screen, I was able at intervals to obtain a reflected view through a glass plate. I may remark that I did not smoke before or after the operation.

On being put back to bed I felt collapsed and sick for about five minutes, otherwise I was quite fit.

About the time I had returned to bed my left leg had practically recovered. My right leg was still immovable, it felt at least thrice as large as the other, and I was not conscious of its position as regards the rest of the body. Sensation appeared to have returned before the power of movement. In about two hours after the injection all signs of the stovaine appeared to have disappeared in all parts.

As sensation returned, I felt intense pain in the wound; it lasted for about six hours, when it gradually passed off, and about 7 p.m. that night I was comfortable. At 9 p.m. I had a small dose of morphia, it seemed to have little effect, because, though I spent a night without pain, I had no sleep at all. The next three nights I had practically no sleep, but had no pain. On the fourth night I had 10 grains of trional and slept seven hours, and awoke all right and had no further discomfort.

Conclusion.—A month after the operation: (1) I felt no pain during the operation. (2) Beyond the pain in the wound as sensation returned, and the subsequent insomnia, I had no discomfort of any kind; I had no headache or backache.

Travel.

THE TURKISH EXPEDITION IN YEMEN IN 1909.

By Captain D. S. SKELTON.
Royal Army Medical Corps.

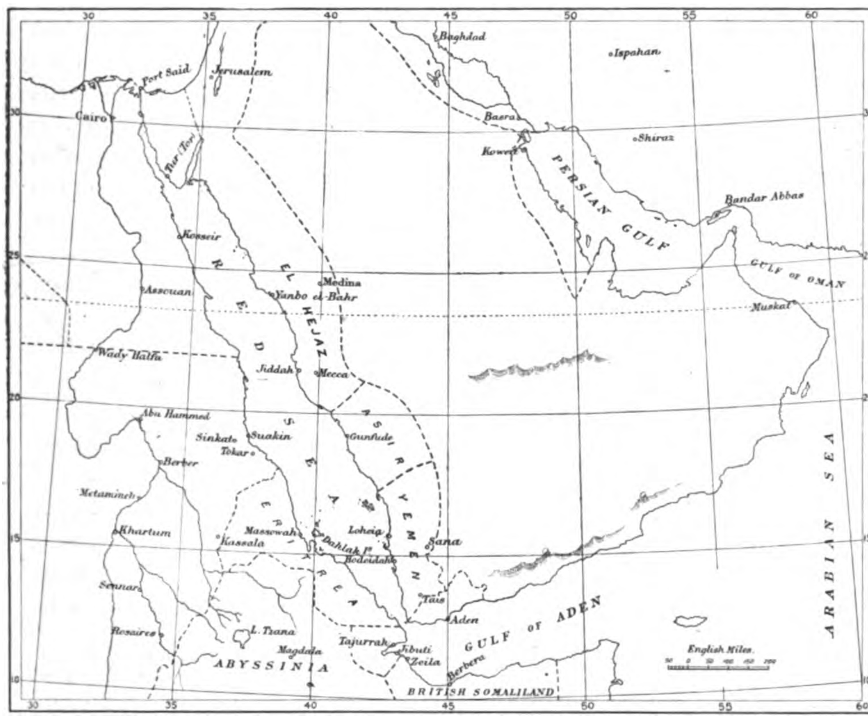
On returning to England from Somaliland this autumn on one of the Egyptian mail steamers, I was face to face with the necessity of putting in a little voyage of fourteen days in the Red Sea. The boat takes all this time, as it calls at every port where it can possibly drop anchor, the stoppages being at such places as Hodeida, Massowah, Suakin, Port Sudan, Jiddah, Yambo, and Tor. Personally, in spite of the discomforts associated with life on a very small steamer, to say nothing of the intense heat and no ice, I found most of them extremely interesting, but especially so Hodeida, in the Turkish province of Yemen, where I had an opportunity of seeing Turkish soldiers on active service, and owing to the courtesy and kindness of Ibrahim Bey, the officer in charge of the Base Hospital, of seeing their field medical arrangements in full swing. For administrative purposes, the Turkish dominions on the Red Sea littoral are divided into three provinces—Hedjaz, with Mecca, Medina, and Jiddah for its principal towns; Asir, with Laheia for its port; and, most southerly, Yemen with Hodeida for an outlet. Yemen borders on the Aden hinterland, so that affairs in that province have a considerable interest, and in some measure a direct influence on Aden trade and hinterland politics.

(1) Political Situation.

Practically speaking, Turkish influence has been dominant in the Yemen since 1871, when Sana (Saana, Senna) was occupied by a Turkish force, which was sent from Syria. The province has never been completely subjected, however, and constant fighting has been the rule for the last forty years. Abdul Hamid, be it said to his credit, had long had in mind the idea of subduing the Bedouin tribesmen of Southern Arabia, but political considerations, a bad selection of leaders, and an empty treasury had proved too much for him. Another important factor was the spirit that animated the troops employed. Under the old *régime*, few of the conscripts sent so far away from their villages ever returned to them. It stands to reason, that troops who seldom or never saw

their pay, who were badly rationed, and poorly led, whose equipment was of the most makeshift character, and whose very arms and ammunition were most inferior, were not likely to make much headway against powerful tribes of Bedouins, who at least were animated by some sort of national spirit.

In 1895, the 7th Army Corps was despatched to the Yemen under the supreme command of Ahmed Feizi Pasha, who soon



realised that he was not likely to be able to accomplish anything, so he petitioned to be allowed to relinquish his command. He was succeeded by Abdulla Pasha. Sana was now blockaded by the Imam Zeyid, and the situation from a Turkish point of view was serious. The Sultan became thoroughly alarmed, and despatched another 16,000 men, but Abdulla was repulsed by the Kublet el Azin tribesmen, under Zeyid. Sana was, however, relieved. After this, and until about July, 1909, no big movement on either side took place.

(2) Political Factors.

(*a*) *The Imam.*—The principal disturbing element in the Yemen is the Imam Yahia Hameed-ud-din. He is the head of a family which claims a direct descent from the prophet Mohamed. The Imam and his followers insist on "Arabia for the Arabs." They resist any foreign influence of any sort.

In 1909 the Imam sent a commission to Constantinople to submit certain proposals to the Sublime Porte. The most important proposition was, that the Turks should occupy the Yemen littoral and the interior only as far as M'nacha. This meant that Sana should be given up to the Imam; but he promised that if he were given the rank of Vali he would keep the roads between M'nacha and Sana open. Considering that the entire produce of Yemen comes from the Sana district, the Porte naturally declined to hear any more about it. The Commission returned to Yemen in August, 1909.

(*b*) *The Mahdi Ardrussi of Asir.*—Since 1691 the dominant native influence in Central Arabia has been Wahhabeeism, and at the present time, on the remains, or rather associated with what remains, of Wahhab's empire, is the power exercised by the Mahdi Ardrussi (the Unconquerable One) of Asir.

The home of Wahhabeeism is the Nejd, where it still flourishes, in a diluted form perhaps. The movement was started by Muhammed ibn Abdul Wahab, who was born in Nejd in 1696. He was supported by Muhammed ibn Sand, chief of Deraya, and succeeded in imposing his vigorous doctrines on nearly all Central Arabia. In 1800 the Wahabi kingdom extended from Mekka to near Baghdad.

The aims of the Mahdi and his tribesmen are practically the same as those actuating the Imam, that is to say, to drive out of Arabia all foreign influence. The Mahdi, however, has met with varying fortune. He undoubtedly has met with severe checks, but again he has inflicted one or two defeats in his turn on the Turkish troops.

The actual cause of *this* outbreak was a difference that the Mahdi had with a local potentate named Abdulla Pasha al Boani (pronounced Booni). Abdulla in August was driven into Hodeida.

Efforts have been made to try and make out that the Mahdi's movement is not anti-Turkish, but purely local and directed solely against Booni. The Mahdi at present is at Subbiah. The facts, however, speak for themselves. In August the Madhi was within

an eight hours march of Hodeida, and foreigners were warned to be ready to embark on anything that could float, if he advanced any further.

The situation now becomes a little clearer, and the object of the Turkish authorities largely increasing their forces in the Yemen more evident. If the Mahdi, backed by enthusiasm and fanaticism, and exultant with success obtained in one or two small engagements, were to join forces with the Imam, the situation would be very grave, and in all probability the Turks would be driven out of the interior of Yemen. Such, however, is the fatuity and jealousy of these pseudo-religious fanatics, that a combination of forces brought about by diplomatic measures, or the necessity of combining against a common enemy, seldom occurs. In any case it is not thought likely by the Staff in Hodeida that the Mahdi and the Imam will combine.

(3) General View of Operations.

Roughly speaking, the line of communication, Hodeida-Sana, shuts off the Mahdi from the Imam. Sana is the advanced base at the present moment. Troops are being massed at Gumfedda, at Laheia, at Sana and at Tais. For the time being, so far as I can understand, no immediate movement against the Imam is contemplated, but simultaneous and concerted action from Gumfedda, Laheia and Sana should bring the Mahdi and that section of the recalcitrants to order. I take it that there is no line of retreat open to anything like 15,000 men (which is supposed to be the Mahdi's following) towards the interior, either on account of there being insufficient water in the wells on the routes that do exist, or else no grazing for stock, camels, mules, &c.—so that caught between three armies the Mahdi must either fight or surrender unconditionally. What we may call the Southern Army at Tais will keep the Imam in order while this is going on.

The above is the general idea of the operations as explained to me.

(4) Medical Arrangements.

Roughly speaking, the number of Turkish troops in Yemen is about 40,000. There are four big hospitals, corresponding to our general hospitals, fixed at Hodeida, Sana, M'nacha, and at Tais. Each of these is fully equipped for 300 beds, but there is no doubt that they are capable of considerable expansion in case of emergency.

I am only able to speak from personal knowledge of the base hospital at Hodeida. The day I visited it there were 282 patients in the hospital. The medical authorities had taken over the permanent barracks that existed, and with a little extra building had made a very fair hospital out of it. There were six large airy wards, each about the length of one of the wards in the Herbert Hospital at Woolwich, but much wider, and there was, in addition, one smaller ward, divided by a corridor from the others in the same block, that led into the operating theatre. The wards were in two long single-storey stone buildings parallel to one another. In between the two were the latrines and ablution rooms. The hospital compound was approached through a gateway with a guard and a guard room; between this and the front of the first block was a pleasant, shady garden. To the left was a small "shelter" built of boughs and leaves and dried mud, which was the Senior Medical Officer's office, and also the place where "the morning sick" attended. Beyond that were the storerooms, dispensary and kitchens. The whole place looked very neat and tidy, and the wards were perfectly clean.

The Staff of the hospital was made up as follows: The chief doctor—or senior medical officer, who is absolutely responsible for everything. He has under him: (*a*) a "director"—a combatant officer—who seemed to be responsible for the cleanliness of the place, and who no doubt awarded small punishments to delinquent convalescents. He corresponds, as far as I can understand, to the commander on board ship, where the senior medical officer would be the captain: (*b*) a secretary; (*c*) six other military doctors; (*d*) the nursing staff. These are men drawn from regiments. Five men are taken from each battalion, and are trained for five months, when they return to ordinary duty. The only merit that can be found in this system is that there is always a supply of semi-trained men in the battalions ready in time of war. The number of nursing orderlies allowed in the General Hospital is 10 per cent. for medical, and 20 per cent. for general surgical cases. As a matter of fact, in the medical wards, with forty patients in each, I noticed three orderlies per ward, and, in the surgical, six. Possibly there was one other for each ward for night duty, whom, of course, I would not see. Those orderlies I saw at work seemed very efficient, especially the two in the operating theatre. In addition to the medical staff attached to the hospitals, each infantry regiment has twelve medical officers, that is, three per battalion, namely, one surgeon-major and two junior officers. Cavalry

regiments have four, artillery one, and engineer battalions three medical officers. I understand a proportion of military medical officers are foreigners; anyway, many are non-Moslem Turkish subjects.

The military medical officers are "caught young," so to speak. The "show" military hospitals in Turkey, especially those at Constantinople (4,000 beds), and Adrianople (1,200 beds), are all good, whilst the Hamidieh military hospital above Pera is one of the best equipped in Europe. It is at these big hospitals that budding military doctors are educated, having graduated at the Military and Naval Medical College. The course of study lasts six years, at the end of which period, all being well, the candidate is appointed as a surgeon-captain. Each year some twelve or thirteen young officers are sent abroad to study. It is a significant fact that nearly all go to France to study, though the teaching staff at the college includes a number of German professors. The net result is that the French model is largely used in their military medical arrangements. I tried to impress on my kind host, Ibrahim Bey, the urgent necessity of his coming to England at an early date to see the English model. It is, indeed, surprising that our model is not used, considering the experience we have acquired in our multitude of small wars.

To return to details: a soldier, sick, reports as usual and is seen by a medical officer, and if the man is ordered into hospital he brings his kit and his rifle, which he hands into store and gets a receipt. His money, too, he has to give up. This latter led to a small episode. Ibrahim Bey wished to show me a money receipt form and he asked a soldier for his, but he had not got one; further enquiry showed there was not a single man in the ward who had had any money to hand in.

(5) Climate and Disease in Yemen.

The Yemen is a healthy country. In general features it is rather like British Somaliland. There is a maritime plain, which at all seasons is hot, and between May and September intensely so. It is arid and almost waterless. Drinking water comes from brackish wells. Seventy miles from the coast there is a sharp ascent to a plateau of from 6,000 to 7,000 feet. It is at this height, or at an altitude only a little lower, that operations are taking place now. The climate in the highlands is distinctly good. The days are not very hot and the nights are cold. The rainfall is considerable and regular, the rainy season being from May to

September. The prevailing diseases are malarial fever (malignant tertian as far as I could gather) and dysentery of a mild type. I saw two men in hospital with guinea-worm, but I strongly suspect they had imported this disease. At Sana pneumonia and bronchial complaints are common. I heard no word about enteric fever. Cholera and plague, of course, have to be watched for, but when I was in the Yemen it was free from both.

There is very little venereal disease at Hodeida; in fact, with the strength of troops at 3,000, there were only six cases of gonorrhœa, and none of syphilis. Venereal diseases in general are, however, more common in the interior, especially at Sana.

There was a fair number of cases of gunshot wounds in hospital, and very nasty wounds they were too, as the Bedouin tribesmen use large-bore weapons and any bit of old iron for a bullet. To be hit in a limb with one of these means amputation nearly always. The wounded, too, have a very rough journey from the front. The only means of transport is by cacolet on a mule. There are no roads, and wheeled transport is not used except for Hodeida and district.

The Principal Medical Officer of the Expeditionary force was at Sana, so I had no chance of meeting him. I learned that a a senior officer was acting as sanitary officer to the force, but otherwise there seemed to be no special precautions taken for the prevention of disease. There were no water sterilisers, and apparently the authorities saw no use for them. After all, *we* in Somaliland, just opposite, do not use them, so I cannot criticise and be quite fair. There was no sort of laboratory attached to the hospital, and probably no microscope in the country; I asked for one, but it was not. The dispensary was well equipped; there is one dispenser and three assistants. I asked Ibrahim Bey how he indented for drugs, &c., of which there seemed enough in store for an army corps, and he told me that "since the Constitution" they could get anything they wanted, that each Senior Medical Officer ordered his own drugs, &c., from Aden, Bombay, Cairo, or Constantinople, as he wanted, to make up for wastage; but I could not understand how they got paid for.

I need hardly say there were scores more questions I wanted to put, and lots more things I wanted to see, but I felt I could hardly take up any more of the Senior Medical Officer's time; as it was, he had given me the whole morning, so I very regretfully had to say "good-bye" after the inevitable coffee.

The following day I spent amongst the men in the rest camp,

where the troops wait till they can be sent up country. The men really were, taken on the whole, of magnificent physique—fine, big men, nearly all of them. Most of them were young. Ten years ago I had seen a good deal of the Turkish army in Syria, and now I noticed a great change. These men in Hodeida were soldiers and looked it, every bit of them. They did their duty in the quiet, stolid way that is characteristic of the Turk, where nearly every man is naturally a sahib and a gentleman, or may at any time become one, if by any chance he is not one to begin with. But there was a spirit about these men. I remember the old lot so well in Syria. They had the air of convicts more than anything else in those days, and worked like men who were slaves. Now the army is more national, and the national spirit is evident. The men wear a serviceable kit, consisting of khaki tunic, khaki knee-breeches and a kind of puttee-legging; a small khaki cap with a Bisley flap, and a good overcoat completes the outfit.

Finally, I confess I was not a little surprised at the efficiency and the smooth working of the medical arrangements of a big Turkish force in the field. There were holes one could pick everywhere of course, but the great thing about it was that they seemed prepared for most things. They had none of the latest inventions, no Röntgen ray apparatus, and, as I say, no microscopes and no water sterilisers; but the sick soldier when he was sick was well cared for, and when wounded stood as good a chance of getting well again as any of our men would under active service conditions, and by virtue of his splendid constitution and natural sobriety just as quickly. In short, their "bundobast" was as good as we make for Somaliland or a West Coast "show," if not better; but, of course, nothing like so perfect as we sent out to Natal with Buller.

In conclusion, I have to thank Ibrahim Bey and Herr Lindenmeyer for their kindness to me, a stranger, and I am also indebted to Colonel W. G. Macpherson, for many kind suggestions, criticism, and information.

Reviews.

MALE DISEASES IN GENERAL PRACTICE. By Edred M. Corner, M.A. An Introduction to Andrology. London: H. Frowde, Hodder and Stoughton. 1910. Pp. xvi. and 228. Price 15s. net.

The aim of this book is to present a collected survey of the diseases to which the male genitalia are peculiarly liable. The idea of the author can be more readily grasped from the following extract in his preface: "Men, not being subject to a physiological process comparable to childbirth, have not been the recipients of so much attention as has been given to women. Yet, if peculiarities of their anatomy and associated diseases are considered, there is quite as much reason for a special science and art in their case as there is in gynæcology for women. The science of the diseases of men should be termed andrology—a name comparable to gynæcology, the science of the diseases of women."

To remove this charge of inattention to the male genital sphere, the author has comprehensively reviewed its chief disabilities in a book of 450 pages. Though perforce little new ground has been broken in this description of android diseases, the old truths of previous knowledge are collated in a most readable form.

An outstanding feature of excellence is to be found in the number of illustrative cases which form a considerable part of the text. These cases are followed by the author's comments or explanatory notes, and convey far more information of a practical nature than can be gleaned from the lists of hypothetical signs and symptoms one is so prone to associate with the average text-book.

The chapters on "Diseases of the Testicle and its Imperfect Descent" are particularly full and descriptive, and will give much assistance to the practitioner in his anxiety to form a correct diagnosis of these conditions. A summary of the remote effects of the operation for varicocele, p. 279, has a distinct interest for medical officers in the Services, though the author's criticism on the attitude of recruiting medical officers towards this disability would probably be modified by a little experience of Service conditions. The book is well and copiously illustrated, the photogravures showing that high finish one is led to expect from a volume published by Henry Frowde, Hodder and Stoughton.

J. W. H. H.

NATIONAL HEALTH MANUALS: INFANCY. Edited by T. N. Kelynack, M.D. London: Robert Culley, 26, Paternoster Row. Pp. vi., 186. Price 1s. net.

This most practical book can be strongly recommended; it is well printed, and will prove a compendium of most useful knowledge to all who have to deal with the feeding and upbringing of infants. The various chapters are the work of the best-known practitioners and teachers in the domain of the treatment of diseases of children, together with their hygienic surroundings. The book is admirably written; it is the first of a series which is intended to afford concise and up-to-date scientific presentation of the principles and practices which guide and govern the

establishment and maintenance of personal, domestic, and national health.

To officers in medical charge of women and children the book should recommend itself. The chapters on "The Hygiene of Infancy," by Sir William Thompson; "The Feeding of Infants," by Dr. J. S. Fowler; and that on "The Common Disorders of Infancy and their Prevention," by Dr. Dingwall Fordyce, are of exceptional value, and, though written in the first case for the lay community, they will equally recommend themselves to the profession, more especially the junior members of it. It is a book well worth careful perusal, and owing to its moderate cost, apart from its intrinsic merits, it ought to be in the hands of all those who have to deal with the welfare and upbringing of infants.

F. M. M.

A PRACTICAL STUDY OF MALARIA. By Wm. H. Deaderick, M.D. London: W. B. Saunders Company. Pp. 402.

The number of works on malaria which have appeared in the last few years makes it necessary that any new one should have some very special features if it is to find a welcome. Dr. Deaderick writes from the point of view of a man engaged in private practice in a highly malarious country, and the information which he gives has therefore the special advantage of coming from one who is in daily contact with the disease. But the book is by no means of the empirical order; it shows evidence of as close an acquaintance with the scientific as with the practical side of the question; and the combination of science and practice so happily blended results in one of the best books on malaria that it has been our privilege to read.

In the chapter on "Ætiology" the evidence which has led us to our present knowledge of the causes of malaria is given in detail, and along with it there are given practical details for the study of mosquitoes and malarial parasites. In the matter of blackwater fever, of which the author has had a large experience, he is in favour of the para-malarial theory of its causation, but he gives the evidence which has been brought forward in favour of all the other views on the subject, and treats the matter quite dispassionately. The chapter on "Diagnosis" is especially practical, and is one which can be profitably read and pondered over by every tropical practitioner. One notes, for example, the necessity for a repeated examination of the blood, since in cases which have not taken quinine the parasites can only be found on the first examination in two-thirds of the patients, while in people who have taken quinine a single examination will only reveal the presence of parasites in one-third of all cases. Similarly, the author draws attention to the fact that cases of pernicious malaria do occur in which it is impossible to find parasites in the peripheral blood even after repeated examination, cases where on *post-mortem* examination the parasites are swarming in the internal organs. The chapter on "Treatment" contains many valuable suggestions; the writer specially recommends the use of tannate of quinine for general use, and he draws attention to the necessity of using dilute solutions when one has to resort to intramuscular injections. He also reminds one of the antimalarial power of opium (dependent on the narcotine which it contains), a thing which is worth remembering when one is faced with one of those unfortunate patients who cannot take quinine at all.

The illustrations are good, and, if some of them seem at first sight to be rather of the popular variety, they are none the worse for that, since those pictures which illustrate the kind of places where mosquitoes breed emphasise more than any words can do the danger of such seemingly innocent things as water-tubs and the like. The volume ends with a table of no fewer than 449 references. The book is a practical one, it is a good one, and we can recommend it very highly to all those engaged in tropical practice.

W. S. H.

THE ELEMENTS OF MILITARY HYGIENE, ESPECIALLY ARRANGED FOR OFFICERS AND MEN OF THE LINE. By P. M. Ashburn, Major, Medical Corps, U.S. Army. Published by Houghton Mifflin Company, Boston and New York. 1909.

This book, designed, as stated in the title, for the use of non-professional men, thoroughly justifies its publication. The ground covered is wide, beginning with the physical condition of the recruit, and the various "points" which have to be considered in accepting or rejecting him, and going on to a full consideration of his life in camp and quarters; and the causation and principles of prevention of the diseases incidental to military life. In spite of its wide scope, the book is of but moderate size, and the teaching is clear without being presented in too concentrated a form. The conditions dealt with are, of course, those to which the soldier of the United States is likely to be exposed, but the general principles are the same as those which guide us in our own work; and the value of the book is by no means restricted to the service for which it is primarily intended. It is refreshing to note the sensible view taken by Major Ashburn on the question of water examination on the field. "There are no tests that can be quickly applied that will enable a medical officer to pronounce a given water supply safe. He may form an opinion to that effect from a consideration of the source and surroundings of the supply, but any idea that he can, by a simple and quick chemical test, or a microscopic examination of it, gain positive knowledge that it is pure and safe is fallacious, and should not be entertained." More detail as to the purification of water might be advantageously added, and the value of the book would be greatly enhanced by the inclusion of some clear diagrams or illustrations.

C. H. M.

GUIDA PRACTICA PER IL MEDICO MILITARE IN CAMPAGNA. Compilata par cura del Dott. Gio. Francesco Randone, Tenente Generale Medico. Unione Tipografico-editrice Torinese. L. 10.

A notice of this excellent book cannot begin more appropriately than by quoting the initial paragraph of the preface. "The compilers of this guide have attempted to include in one volume, of no great bulk, everything that appertains to the service work of the Military Medical Officer in the field." Appropriately, therefore, the opening section of the Guide consists of a short review of the elementary principles of logistics and tactics, contributed by Captain Foschini, of the Italian Infantry. This section includes details of strength and composition, length of road taken up on the march, and space occupied in camp of all units of the Italian Army. The principles that guide the various arms in

action are touched on, and also the administration of the different accessory services. This is followed by a short chapter on map-reading. The third part of the guide refers purely to the administrative work of the Medical Department on service, from the front to the base, which in principle is identical with that of other European armies. Following on this comes Part IV., referring entirely to gunshot wounds, the earlier chapters detailing the different forms of projectile in use in different armies, with their effects on the human body, and the proportionate losses, &c., in recent campaigns. The portion referring to actual surgical treatment is long—perhaps rather too long in a book of this nature. The fifth part is concerned with field sanitation, and, appropriately enough, begins with a dissertation on the ration of the Italian soldier. The meat portion of this ration is low to English ideas, consisting only of not much more than three-quarters of a pound; but, on the other hand, the supply of carbohydrates is proportionately high, amounting to 750 grammes of bread and 125 grammes of rice or other vegetable. A special issue of fat is given and 20 grammes of sugar, which is certainly low when compared with the ration of this article in our Service (2 oz. = 56 grammes). The total energy value amounts to little more than 3,000 calories, w ch, in the light of recent experience, must be looked on as distinctly deficient. In addition, the soldier carries in his haversack 440 grammes o preserved meat in two tins, with 400 grammes of biscuit, to be kept always available for emergency. This ration is called the "Viveri di riserva," but it is not stated whether the soldier is allowed to consume it at will or only by order. Dr. Testi, who writes this section of the Guide, insists very strongly on the value of sugar as a source of energy—an opinion quite in consonance with all modern experience, more especially that of the Japanese in Manchuria. The purification of water is hardly dealt with at such length as one would expect in a book of this nature; the different methods—heat, filtration, and chemicals, being mentioned, but not described in detail. The concluding part of the book is concerned with the conditions of service of the personnel of the Medical Department.

The Guide is, without doubt, a most excellent handbook for the Military Medical Officer. Its only fault is that it tries to compress too much in too little room. The section on Hygiene "seems to suffer rather from the fact that it has to share "house" room with that on "Surgery." The latter has allotted to it 300 pages, whilst the former is perforce content with a mere 120 odd. Seeing that surgery makes only an occasional demand on the skill of the Army Medical Officer, whilst that of sanitation recurs daily and hourly, the proportion might well be reversed. This is, however, a minor point. The only book at present that can compare with the Guide of Dr. Randone is Cron's *Feld-Taschenbuch für k. und k. Militärärzte*, which has the advantage of greater portability. The illustrations are excellent, and those relating to the formation of different military units and to map-reading especially instructive to the Medical Officer. Dr. Randone must be congratulated on the production of this book, which reflects great credit on all concerned in its compilation, and which is indispensable to anyone who wishes to study the medical services of the Continental nations.

C. H. M.

Current Literature.

A Simple Method of Staining Spirochætes in Films.—The following process described by Khitrovo in the *Roussky Vratch*, appeared in the *Archives Médicales Belges*, of November, 1909.—A scraping of the suspected sore is taken in the usual way and spread on a cover-glass; it is then fixed by osmic acid vapour, to prevent the smear becoming detached when being finally washed. It is next immersed in a saturated solution of nitrate of silver made with 95 per cent. alcohol and left for four hours; this solution should be in a clear glass receptacle and remain exposed to diffuse light. At the end of this time the film preparation should be dark brown; after washing with water it is ready for examination. Spirochætes are easily detected without even the aid of an immersion lens, as they swell up and show very distinctly in consequence of being impregnated with the nitrate of silver. They can be readily detected even in thick smears, which greatly facilitates their recognition when the number is very limited. C. E. P.

Dried Milk.—Stabs-apotheker Dr. Strunk has made extensive examinations as to the composition and keeping properties of dried milk. His work is published in *Veröffent. aus dem Gebiete des Militär-Sanitätswesens*, Heft 41, iii. Teil. His conclusions are as follows:—

(1) Dried milk prepared from whole or partly skimmed milk in spite of the most careful storage soon acquires a bad taste owing to changes in the milk fat. It cannot therefore be stored for military purposes for any length of time.

(2) Prepared from skimmed milk the powder was found to retain its proper taste for a year.

(3) It must be preserved in air-tight bottles (or possibly tins). If air is admitted the contents become orange-yellow and in less than a year the casein quite loses its solubility.

(4) The samples which were found to be stable differed from the unstable ones in three particulars: (*a*) To produce an even mixture the former required 210 to 245 per cent. of water as against 100 to 160 per cent. for the unstable samples; (*b*) when warmed to 100°C. for two hours no change took place in the more stable samples, the others turned reddish in colour; (*c*) small quantities of alkaline carbonates were detected in some of the former, the quantity was however negligible.

Tables of analyses are given from which it appears that the fat rarely exceeds ·25 per cent., while the casein and albumin is about 35 per cent. (10 cgm. of dried milk were assumed to be equal to 100 cc. of fresh milk). C.E.P.

Comparison of Recruiting Statistics in Germany and France for the year 1908 (*N.M.B.*, vol. lxxvi., 1910, p. 78):—

	Germany	France
Liable for service in 1908 on attaining 20 years of age	527,280	318,449, includes 15,245 absentees
Liable for Service from former years	670,909	49,096
Total	1,198,189	367,545
Compared to the previous year	+ 8,344	− 15,758
Total number unfit to serve	34,133 = 6·3 %	44,270 = 12·0 %
Volunteers	61,153 = 11·3%	26,609 = 7·2 %
Postponed for temporary unfitness	684,197	48,792 = 13·2 %
Taken for service with armed troops	221,852	221,413 = 65·0 %
,, ,, departments	..	17,706
Invalided soon after enlistment	..	29,357 = 8·0 %

Germany has four times as many men as France liable to serve and enlists 8 to 9 per cent. more than the required number in order to replace those invalided soon after enlistment, while France has no reserve from which to replace these men.

C. E. P.

Training of Nursing Sisters for Civil and Military Duties in Germany.—In the *Deutsche Militärärztliche Zeitschrift* for October 20th, 1909, Generalarzt Dr. Korting has a lengthy article dealing with the history and present position of the training of nurses in Germany. The only points worth noting are:—

(1) On May 10th, 1907, the Minister of Public Instruction issued a decree in accordance with which all persons employed as nurses for the sick are obliged to undergo one year's continuous practical and theoretical instruction in a training institution recognised by the State, and to pass a qualifying examination held by a board whose president must be a Government delegate. Successful candidates are to receive State recognition. In some schools (*e.g.*, Dortmund and Dusseldorf) a two years' course is insisted on.

This order was objected to by the religious nursing orders, as they disliked lay interference. The course demands a high standard of general education and so prevents any of the poorer classes from qualifying as nurses.

In April, 1909, an official training manual was approved by the Minister of Public Education, and ordered to be used in all officially recognised schools of nursing. This book is intended for the instruction of persons of both sexes and is a purely civil work. For "Schwestern" and "Hilfsschwestern," who are liable to employment in military establishments in war, Dr. Korting has written a small "Unterrichtsbuch," modelled on the Army Manual. This book explains the working of military hospitals, so that nursing sisters of the reserve can keep themselves posted up in military routine in case of being called up for duty in war time.

C. E. P.

The German Army Wheeled Kitchen.—In the *Deutsche Militärarztliche Zeitschrift* of October 5th, 1909, Stabsarzt Dr. Georg Schmidt gives a full description, with three illustrations, of the mobile German field kitchen. The kitchen consists of two portions limbered together. The front portion is fitted with seats for the driver and cook. It carries 200 emergency rations, forage, tea, coffee, and salt, as well as various kitchen implements. A backboard lets down to form a table. Fresh meat and vegetables can also be carried if required.

The back portion, which is the actual kitchen, contains a large round boiler with a capacity of 40 gallons, a 14-gallon kettle, and a fuel box. The large round boiler is made of pure nickel with an outer copper jacket; between the two there is a space of $\frac{1}{3}$ inch filled with glycerine having a boiling point of 290° C. The fireplaces are quite distinct, each having its own flue leading into a collapsible chimney. A large nickel tea or coffee strainer is also provided. When prepared, the coffee is run off through a tap. All accessory appliances, *e.g.*, coffee-roaster, coffee-grinder, ladles, &c., are carried in special compartments.

The empty kitchen wagon weighs 1,870 lbs.; when fully equipped and loaded the weight is 2,895 lbs. It is drawn by two horses.

The large boiler is used for boiling or stewing meat and vegetables, but not for roasting. A quantity of 35 gallons can be cooked at a time, if more is required the food is made more concentrated, and boiling water added to it when served.

The cooking of a meal with coffee takes about 37 lbs. of wood or 30 lbs. of coal. The fuel boxes hold together 84 lbs. of wood or 100 lbs. of coal, or 51 lbs. of wood and 84 lbs. of coal.

When two daily meals are cooked the provision of fuel, using wood alone, is sufficient for one day, using wood and coal for two days, and using coal alone for three days.

The glycerine lasts four to five months, it does not freeze, and prevents the food from being burnt. Peas and beans should be soaked before being cooked. Rice, potatoes, and meat cut into large pieces are placed in the boiler along with the necessary quantity of water, the boiler lid is then fastened down. With a moderate fire the contents begin to boil in about an hour; twenty minutes after this the chimney and fire-place are closed, and cooking continues automatically. Rice and potatoes take about three-quarters of an hour, pulses one and a half to two hours, pork three-quarters of an hour to one hour, meat one and a half to two hours. Before serving, salt and spices should be added. If the food is to be kept for any length of time in the boiler it must be re-heated every twelve hours in order to maintain the temperature at 50° C. If the temperature is allowed to drop below 50° C. the food is inclined to become sour.

With a moderate fire the water in the kettle begins to boil in about three-quarters of an hour. The fire and flue traps are then half closed. Half of the ground coffee is to be put into the strainer and well stirred round in the boiling water, the remainder of the coffee is then used in the same way. Five minutes later the fire can be allowed to go out. After use all utensils must be scrupulously cleansed, especially the coffee-strainer and kettle, which in addition must be well aired.

This kitchen was tried in the manœuvres of 1909 by the medical units of the Guard, 9th and 10th Army Corps, and gave great satisfaction. Its adoption for the whole German Army is estimated to cost £950,000.

C. E. P.

Incinerators in Camp.—In the *Deutsche Militärärztliche Zeitschrift* of October 20th, 1909, Dr. A. Lion, Stabzarzt 5th Bavarian Regiment, has a long article on the sanitation of camping grounds. On p. 836 he refers in terms of high praise to the British Army "Manual of Sanitation in its Application to Military Life." His conclusions are as follows :—

(1) In the present state of our knowledge, if hygienic discipline is enforced it is quite possible to keep camps free from all infectious diseases.

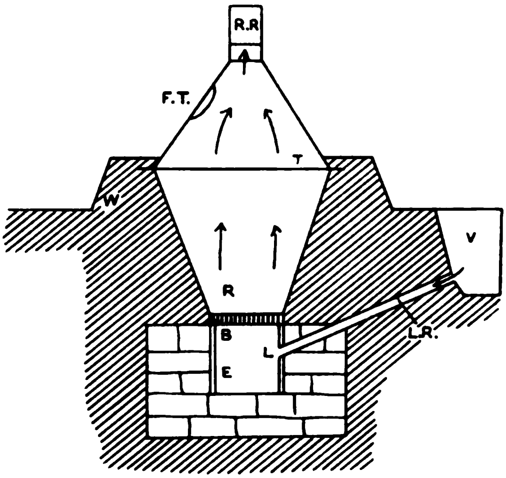
(2) Human and animal waste products must be regarded as the source of origin of army diseases. All such matter must therefore be collected and removed from camp in such a way as to avoid any contamination of ground, water, or food supplies.

(3) After removal the waste products must be rendered harmless or destroyed either by disinfection, burying or burning.

(4) Burning is the best means of disposal; and in very large forces should be regarded as absolutely necessary.

(5) Mobile incinerators are not satisfactory. An incinerator quickly constructed on the spot best fulfils our wants.

(6) Extensive experiments should be carried out in order to determine the best form of incinerator which can be rapidly and cheaply constructed out of such materials as are to be found in every camp. To begin with, comparative tests of all apparatus which have been tried or suggested should be made.



RR—Chimney. FT—Trapdoor for rubbish. E—Ironbucket. R—Gridiron. LR—Cast iron pipe to supply air to fire. T—Iron cover for fire. V—Air Inlet.

Dr. A. Lion then gives the following particulars of an incinerator designed by Kori, a civil engineer of Berlin. The main idea is to dig a funnel-shaped hole in the ground, the upper diameter is about one yard and the lower about half a yard, the depth of the hole is at first 2 feet 6 inches, which is later on increased to about 3 feet 6 inches by piling up the loose earth excavated in digging the hole. The inner surface of the cone should be covered with mud and well hammered or in permanent camps lined with brick work. At its lower end the earth cone opens into an iron bucket supported by a flange; this bucket receives the ashes and can be removed for emptying; on the top of the bucket there is a gridiron on which the fire is built. The bucket is contained in an excavation which must be lined with stones to prevent the earth falling in. A cast iron pipe opens into the bucket, this allows a free supply of air for the fire. A conical iron cover made in separate pieces for convenience of packing, covers the whole and prevents rain from entering; this has a trap door through which rubbish is fed into the fire. The whole of the iron apparatus weighs 100 k. (about 2 cwt.) and costs about £4. C. E. P.

Wassermann's Reaction.—F. Blumenthal contributes a long article on Wassermann's reaction to the *Dermatologische Zeitschrift*, January and February, 1910. He prepares his homolytic amboceptor by injecting 1 cc. of well-washed sheep's blood corpuscles suspended in 4 cc. of physiological salt solution into the auricular vein of a rabbit, repeated

twice or thrice at an interval of five days. He makes use of five times that amount of amboceptor, which causes complete laking of 1 cc. of a 5 per cent. emulsion of sheep's blood corpuscles, when 0·1 cc. of guinea-pig complement is added. In his earlier experiments he employed as antigen a watery extract of syphilitic liver; latterly he has substituted an alcoholic extract. He obtained good results from human, guinea-pig and ox-heart extracts. He thus classifies his observations.

	Cases	Positive reaction	Percentage
Primary syphilis	157	98	62
Secondary syphilis, manifest	623	597	96
Tertiary syphilis, manifest	230	218	95
Congenital syphilis	62	55	89
Secondary syphilis, latent	352	239	68
Tertiary syphilis, latent	257	108	42
Tabes	14	12	86
Total	1,689	1,327	79
Controls	377	5 (reaction incomplete in two)	1

If we compare these figures with the following statistics of other observers we can convince ourselves of the value of Wassermann's reaction form a clinical point of view.

H. Merx (*Derm. Zeit.*, December, 1909, p. 83) reports that among 1,972 cases of lues, a positive reaction was noted in—

71·6 per cent. of those suffering from primary syphilis.
97·0 ,, ,, ,, secondary syphilis.
33·5 ,, ,, ,, early latent syphilis.
80·3 ,, ,, ,, tertiary syphilis.
20·8 ,, ,, ,, late latent syphilis.
81·8 ,, ,, ,, congenital syphilis.

F. Hohne's (*Berl. Klin. Woch.*, No. 13, 1909) figures are—

In primary syphilis	38·5	per cent. positive reactions.
,, secondary syphilis	79·5	,, ,, ,,
,, tertiary syphilis	63·0	,, ,, ,,
,, early latent syphilis	38·4	,, ,, ,,
,, late latent syphilis	26·2	,, ,, ,,
,, cerebro-spinal syphilis	16·0	,, ,, ,,
,, tabes	60·0	,, ,, ,,
,, general paralysis of the insane	80·0	,, ,, ,,
,, congenital syphilis	87·5	,, ,, ,,

Becker's (*Münch. Med. Woch.*, No. 11, 1909), examined 350 cases:—

63·6 per cent. of cases of primary syphilis gave the Wassermann test.
90·0 ,, ,, secondary ,, ,, ,, ,,
55·5 ,, ,, tertiary ,, ,, ,, ,,

A complete reaction is diagnostic of syphilis, if scarlet fever, trypanosomiasis, frambœsia, leprosy, malaria and recurrent fever can be excluded.

If symptoms be present a negative reaction would indicate a probability of 95 to 100 that the affection was not syphilitic. A negative result in the absence of signs would reduce the chance of the individual's being infected to 50 to 100. If the test be repeatedly negative the question of syphilis may be excluded. The reaction appears in the fifth or sixth week after infection and in untreated cases becomes gradually more marked.

Treatment by mercury, and to a less extent by potassium iodide, tends to abolish the reaction. Frequently a positive response before treatment becomes negative at the end of the course, though this is not constant.

Sometimes the most energetic therapeutic measures are powerless. Blumenthal's observations show that under medicaments a positive reaction is converted into a negative in only 38 per cent. of cases. The earlier stages of the infection are less resistant than the later; 56 and 30 are the respective percentages of the favourable endings. Merx reports that only 25 per cent. of luetic people who have had early treatment give a positive reaction. If the remedial agents have not been administered till late, then 66 per cent. react. Busch found that in 37 per cent. of 197 treated patients the Wassermann test was positive. It was positive in seventy-four out of seventy-five untreated cases. Blumenthal has noted that a positive reaction which has disappeared during the course of treatment will often recur. This is the rule after the first "kur," which is usually successful in converting a positive into a negative reaction. In late "kurs" however, success is more difficult to attain, but if a negative phase occurs it is of longer duration.

It is not possible to measure the length of the "kur" by Wassermann's test. If the reaction should have vanished it may soon assert itself again. Sometimes, though a positive response is still present at the close of the "kur," it may disappear after a few weeks without further remedial measures. The test also may become negative spontaneously in rare instances. On the other hand, under the influence of mercury a negative response may become positive for a time. A negative test does not necessarily indicate recovery. Active symptoms may develop in a case which reacts negatively. Nor does a negative reaction guarantee that the person is no longer infectious. Conversely, a positive Wassermann test does not indicate, in all cases, the infectivity of the individual. Blumenthal and Hoffmann deprecate excessive treatment in those instances in which a positive reaction persists in spite of mercury, &c. But therapeutic measures should not be discontinued only on the ground that Wassermann's test has become negative.

The almost universal presence of the reaction in florid syphilis, its frequent disappearance after the exhibition of mercury, its recurrence with the onset of reminders, led Blumenthal to the conclusion that the test signifies active, or recently active, growth of the virus. Whereas a negative response, unless persistently negative, would imply no more than that the *Treponema pallida* might be in a resting stage. Three cases are mentioned in which the abortive treatment of syphilis by excision of the chancre and free mercurial administration was proved to be successful by the absence of secondaries and by a constantly negative Wassermann's reaction. The Wassermann test is the only method of detecting latent syphilis. Bausch observed a positive reaction in seventy-five women who were mothers of syphilitic progeny, though they themselves had had no symptoms. Blumenthal found that ten out of fifteen mothers of offspring showing sign of syphilis reacted postively. Similar observations have been recorded by numerous writers. C. B.

Typhoid Media.—W. Gaehtgens and G. Brückner (*Cent. f. Bakt.*, Orig., February 19th, 1910, p. 559) report that they have made 11,876 bacteriological examinations of the dejecta of 9,387 people. They obtained 1,589 positive results by making use of Lentz and Tietz malachite green agar and Endo's fuchsin agar. They tested the merits of the media given below with the fæces of twenty-two typhoid carriers, seventy-two enteric, and six paratyphoid cases.

They isolated the *Bacillus typhosus* or *B. paratyphosus* by means of—

Sodium sulphite malachite green agar (Padlewski) in	48	per cent.
Endo's agar	50	,,
China green agar (Werbitski)	53	,,
Caffein fuchsin agar (Gaehtgens)	58	,,
Brilliant green picric acid agar (Conradi)	59	,,
Malachite green agar (Lentz and Tietz)	66	,,

Lentz and Tietz medium contains 0·53 per cent. of a 0·5 per cent. alcoholic solution of pure malachite green in crystals. The reaction should be such that 10 cc. of $\frac{N}{1}$ alkali are required to bring a litre of the agar-agar to the phenolphthalein neutral point. It should be freshly prepared, since exposure to light acts deleteriously on the dye. The plates should be incubated twenty-four to forty-eight hours after inoculation. If the typhoid colonies are not well marked a few drops of saline fluid are run over the surface of the agar. Endo plates are then spread with the emulsion. The *B. typhosus* was detected in the fæces of 50 per cent. of the enteric fever patients in the first or second week, and of 75 per cent. of those in the third week. C. B.

A New Method of Diagnosing Enteric Fever.—Pfaundler observed that the *Bacillus coli communis* produced a fine network of threads when grown in the presence of anti-coli serum. Kraus and Löw established this fact, and proved that many bacteria, including the *B. typhosus*, behaved in a similar manner under the action of the homologous serum. Mandelbaum (*Munch. med. Woch.*, January 25th, 1910, p. 178) makes use of this characteristic in the diagnosis of enteric fever. A tube of broth, containing 2 per cent. sodium citrate, is inoculated with *B. typhosus*. One part of the patient's blood and ten to fifteen parts of this broth are drawn into a sedimentation pipette, which is then incubated at 37° C. for four hours. If the blood should have been abstracted from a typhoid patient or convalescent, the bacillus will have grown into long threads or clumps; no isolated, motile rods are then to be seen. He obtained this positive reaction in twelve people who were suffering from enteric fever, in some of whom the agglutination test, $\frac{1}{25}$, was negative. The blood of those who had been convalescent for more than a year after the attack was somewhat weaker, for a few motile rods might be visible among the chains and clumps. He noted the reaction in a typhoid carrier. The bloods of seventy-five controls gave negative results. Mendlebaum states that typhoid and paratyphoid fever may be distinguished by examining the pipettes prepared with the respective bacilli at the end of twenty hours; the difference between the growth of the infecting agent and that of the other will then have become still more accentuated. He claims that specific agglutinins can be distinguished from normal and co-agglutinins by this procedure, even if their agglutination value be the same. He draws attention to the value of the test in those febrile cases in which the Widal reaction is negative. C. B.

The Serum Diagnosis of Syphilis.—Hecht's method, Fleming's modification of which has been extensively employed by Captain T. H. Gibbon (Journal of the Royal Army Medical Corps, vol. xiv., No. 2, p. 160), has the great advantage of simplicity. Sheep's blood from the slaughter-house only is required, hence a vivisection licence can be dispensed with.

J. Bruckner and P. Galasesco (*Comptes-rendus Soc. Biol.*, vol. lxvi., p. 188, June, 1909) have confirmed Hecht's observations. As antigen they used a 2 per cent. alcoholic extract of guinea-pig heart, or a 3 per cent. alcoholic extract of ox heart. They took as a single dose of antigen such a quantity as would deviate completely the complement of a syphilitic serum, while double the amount would not completely fix the complement of a normal serum. They examined the blood of ninety-nine luetic individuals, controlling their results by Wassermann's test. While 75·45 per cent. reacted positively by Hecht's method, only 59·4 per cent. thus responded to Wassermann's test. The superiority of the former appeared markedly in those cases of latent syphilis in which the information obtained was of the most importance. The blood of twenty-five healthy people gave negative reactions; also that of three scarlet fever patients behaved similarly. C. B.

A Simple Method of Blood Culture.—To overcome the germicidal properties of the blood is the object of the various methods of blood culture. Conradi uses bile for this purpose. Castellani reduces the bactericidal power of the blood by diluting it with fifty times its volume of nutrient broth. E. Gildemeister (*Arbeiten aus dem Kaiserlichen Gesundheitsamte*, Bd. xxxiii., Heft 3, p. 619, February, 1910) finds that sterile water serves as well. He reports six cases in which he isolated the typhoid bacillus from the blood by this method. In one of them bile cultures had failed. C. B.

Rations of the Russian Army in Peace and War.—A *précis* in the *Deutsche Militärärztliche Zeitschrift* of November 20th, 1909, gives the following facts regarding the Russian rations :—

A. In Peace.—Army Orders No. 769 of 1905; Nos. 209 and 272 of 1906; No. 475 of 1907.

(1) Daily bread ration per head 926 grammes of flour, or 1,230 grammes of bread, or 820 grammes of biscuit and 134·4 grammes of groats.

(2) Cooking ration (*Priwarotschnsje dowolstwije*) : (*a*) "Ordinary ration," 307·5 grammes of meat together with vegetables, butter or fat, pepper and wheaten flour to the value of 2.5 kopecks per head daily. (*b*) "Increased ration" is one ordinary ration with the addition of half the ordinary ration. (*c*) "Reduced ration," 307·5 grammes of meat and 1.25 kopecks for butter, salt, &c.

(3) Tea ration : 205 grammes tea and 2,562 grammes of biscuit for every 100 men.

B. In War.—(Army Order 346 of 1899 and 123 of 1904.)

Daily ration per head 717·5 biscuit or 1,025 grammes bread, 410 grammes of meat, or 302·5 grammes (net weight) of preserved meat, 101 grammes of groats, 46·2 grammes of salt, 252 grammes of fresh or 16·8 grammes of dried vegetables, 21·0 grammes of butter or fat, 16·8 grammes of flour (? roasted) 6·3 grammes of tea, 12·6 grammes of sugar, 0·7 grammes of pepper.

In addition the General Officer Commanding can authorise the issue of one glass of Branntwein ($\frac{1}{80}$ eimer 5 ounces), half a glass of vinegar or one glass of lime juice. Salted meat, bacon, dripping, may be issued in place of meat or tinned meat.

The "ordinary" ration is issued to units of regular troops; the "in-

creased " ration (one and a half of the ordinary) is issued to detachments of less than twenty men.

Subsistence money is issued to single men on command or to small parties, not belonging to any regular unit, who are detailed to follow troops in war. C. E. P.

Notes by Giemsa on the Application of his Eosin-Azur Method to **the Staining of Fresh Films.** (Reprint from the *Deutsch. med. Woch.*).—Giemsa's eosin-azur method of staining which is now so universally employed for studying the morphology of protozoa has hitherto only been available for use with dried sections, on account of the unreliable results obtained with fresh preparations. Several authors, Sternberg (1) Gottberg (2), Schmorl (3), have tried to adapt the method to fresh films, but the results were far from satisfactory, as in some cases the nuclei were stained blue and the protoplasm red, in others the whole section took on a red-violet colour as if a single stain had been used, in consequence of which the parasites could only be recognised with difficulty. Giemsa has worked out the following plan for staining fresh films.

Fixation.—Sublimate appeared to offer most advantages as it acts rapidly, and all the surplus salt can be removed by iodine and potassium iodide. Experience soon showed that only very dilute solutions of iodide followed by frequent washings in alcohol should be used. Failure sometimes resulted from a small quantity of iodine remaining in the preparation. Hence potassium iodide, which is much more soluble, was found to be preferable, but the specimen could not be left for any length of time in the sublimate solution, as otherwise deposits of mercury in combination with iodine were formed. Hence free iodine together with iodide of potassium had to be used. To eliminate the iodine he adopted Heidenhain's plan of placing the preparations in a solution of sodium thiosulphate, which completely removes every trace of iodine.

Staining.—The process hardly differs from that previously described by Giemsa, the time of staining merely being somewhat prolonged, as fresh sections or smears do not take up the stain as rapidly as hardened sections. If the staining process is carried too far it may require soaking in distilled water for several hours in order to obtain a sufficient degree of differentiation.

Mounting in Cedar Oil.—The removal of the moisture before mounting in cedar oil gave rise to some trouble, as the ordinary method of dehydrating by the use of alcohol was found to produce too great a discoloration. Acetone, however, will mix with water without becoming turbid, and does not decolorise to any extent; this discoloration can be almost prevented by dissolving varying amounts of azur-eosin (60 to 80 per cent.) in the acetone mixtures. Von Prowazek and Yamamoto, by using this plan, were able to demonstrate the vaccine body in smears from the cornea.

Acetone when mixed with xylol can absorb a relatively large quantity of water without becoming turbid, and at the same time has a comparatively low power of decolorising the specimen. The capacity of acetone for absorbing water is in inverse proportion to the amount of xylol added to it. By using different mixtures of xylol and acetone, Giemsa has succeeded in procuring beautifully stained and permanent specimens.

The various steps of the process are as follows:—

(1) Fixation of the moist cover-glass preparation in sublimate alcohol (Schaudinn's method, two parts of a concentrated watery solution of sublimate and one part of absolute alcohol), for twelve to twenty-four hours or even longer.

(2) A short washing in water, after which the preparation is placed for five to ten minutes in a solution of 2 grammes of potassium iodide in 100 cc. of distilled water and 3 cc. of lugol solution. Immediately after this

(3) A short washing in water, followed by ten minutes in a ½ per cent. watery solution of sodium thiosulphate. The preparation, which previous to this appeared to be yellow, should now become bleached.

(4) Washing for five minutes in flowing water.

(5) The specimen is now placed in a freshly-prepared dilute solution of Giemsa's stain (one drop of the made-up stain in 1 or 2 c.cm.) for twelve or more hours. At the end of the first half hour the stain is to be thrown away and a fresh quantity poured on.

(6) Wash in water and place in the following mixtures:—

(*a*)	Acetone, 95 cc.	..	Xylol 5 cc.
(*b*)	„ 70 „	..	„ 30 „
(*c*)	„ 70 „	..	„ 30 „
(*d*)	Pure xylol.		

(7) Mount in cedar oil.

The degree of differentiation can be regulated by varying the time during which the preparation is kept in *a*, *b*, *c*.

This method of staining cannot be used for preparations which have been fixed as described above, and then preserved in alcohol for any length of time.

This plan of fixing and staining has been tried in a great many different kinds of protozoal parasites, and has never failed to give satisfaction; blood films should be as thin as possible. Compared with dry preparations, this method shows up the differentiation of the structure of the nucleus to a much greater degree. C. E. P.

The Increase in the Height of Conscripts in Norway. By Sanit. Maj. Hans. Daæ (*Deutsche Militär. Zeitsch.*, September 5th, 1908). This writer informs us that, owing to the researches of the late Major Arbo, of the Norwegian Army, the official statistics collected by the War Office and the good work done by the Christiania Military Society in obtaining figures from medical officers yearly with regard to 23-year-old recruits, Norway may now be considered one of the countries whose anthropology has been most thoroughly investigated.

Researches show that the Norwegians are probably the tallest of all the European races. The average height of 23-year-old recruits is 172 cm. (68 in.), and in the territory which lies between latitudes 62 and 69 it is 175 cm. (69 in.). The average heights of the nation may be taken as follows: small, under 162 cm. (64 in.); under middle height, 162 to 170 cm. (62 to 67 in.); average, 170 to 180 cm. (67 to 70 in.); tall, over 180 cm. (70 in.) It has been found that the national height is increasing at the rate of 1 cm. every ten years. For instance, from 1878 to 1882 the average was 168·7 cm. (66½ in.); from 1882 to 1893 it rose to 170 cm. (67 in.); and since then it has risen as follows:—

1898	..	170 cm.	1903	..	170·6 cm.
1899	..	170·3 ,,	1904	..	170·7 ,,
1900	..	170·4 ,,	1905	..	170·7 ,,
1901	..	170·3 ,,	1906	..	170·9 ,,
1902	..	170·7 ,,	1907	..	171·24 ,,

The next table given shows results which harmonise with similar statistics for Germany, Austria, Holland, Italy, Russia, and parts of Switzerland. From it we see that people under 169 cm. (66¾ in.) in height are decreasing, while those over 170 cm. (67 in.) are increasing. During the year 1898, of 100 men examined, 45 were under and 55 over 170 cm. (67 in.) in height; while in 1907 these figures were changed to 41 under and 59 over 170 cm. (67 in.).

OUT OF 100 EXAMINED.

Year	Under 158 cm. (62¼ in.)	158 to 159 cm. (62¼ to 62¾ in.)	160 to 164 cm. (63 to 64½ in.)	165 to 169 cm. (64¾ to 66¾ in.)	170 to 174 cm. (67 to 68¾ in.)	175 to 179 cm. (67½ to 69½ in.)	180 to 184 cm. (70 to 71¼ in.)	Over 185 cm. (71½ in.)
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
1898 ..	0·96	2·23	12·46	29·97	30·79	17·70	5·06	0·83
1899 ..	1·8	1·7	13·0	29·2	31·6	16·9	5·0	0·8
1900 ..	1·7	1·8	12·8	28·4	31·1	18·1	5·3	0·8
1901 ..	1·6	1·7	12·7	28·8	31·3	18·0	5·2	0·7
1902 ..	1·6	1·6	12·1	28·1	31·6	18·5	5·5	1·0
1903 ..	1·8	1·3	12·4	27·1	32·8	17·8	5·8	1·0
1904 ..	1·8	1·6	12·3	28·6	31·2	18·1	5·4	1·0
1905 ..	2·0	1·8	12·8	27·1	31·3	18·3	5·7	1·0
1906 ..	1·6	1·5	11·5	27·3	31·9	18·9	6·1	1·2
1907 ..	1·2	2·7	11·2	27·3	32·1	19·4	6·1	1·2

The average height of a man of 23 is 1 cm. more than a man of 22. Nor does he cease to grow at the age of 23, for it was found that out of 1,284 soldiers, 83·41 continued to grow till their twenty-eighth year; the average increase being 1·64 cm. Of the remainder, 10·52 remained unchanged, while 6·07 had actually grown smaller. W. G. M.

Correspondence.

GUY'S HOSPITAL BLUE BOOK.

TO THE EDITOR OF THE "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS."

SIR,—I should be much obliged if you would permit me to make use of your columns to ask all Guy's men and women who are in India to send me news concerning themselves *or others*, for insertion in the Hospital Blue Book. Dr. Mann, who is editing the same, wrote to me last year and I sent him all the news I could gather from the Guy's men I knew, but it was naturally very limited, seeing how scattered we are in this country. He tells me that news of appointments held, promotions, distinctions, marriages, &c., are all welcome, and read with interest by old friends at home.

News should reach me not later than June 1st.

I am, &c.,
HUGH WATTS,
Captain I.M.S.

Hoshiarpur, Punjab,
March 15th, 1910.

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Journal

of the

Royal Army Medical Corps.

Original Communications.

GEORGE JAMES GUTHRIE, F.R.S., F.R.C.S.

Deputy-Inspector-General.

BY MAJOR H. A. L. HOWELL.

Royal Army Medical Corps.

A RECENT number of this Journal contained an excellent account of the career of Sir James McGrigor, Wellington's Principal Medical Officer in the Peninsular War, and afterwards Director-General of the Army Medical Department. The following is an account of the life work of the greatest surgeon the Peninsular War produced. Great as Sir James McGrigor was as an Army physician and administrative medical officer, equally so was George James Guthrie as an Army surgeon.

Guthrie was descended from an old Forfarshire family, one of the members of which settled in Wexford. The hero of our story was born in London on May 1st, 1785. He received his early education from M. Noel, a Frenchman, from whom he acquired in early life a thorough knowledge of the French language. When only 13 years of age he was, on the advice of Mr. Rush, Inspector-General, and at that time a member of the Army Medical Board, apprenticed to a surgeon named Phillips, and studied under Hooper at the Marylebone Infirmary. In 1800 Mr. Rush appointed him hospital assistant to the York Hospital. He held this post until the following year, when Mr. Keate, the Surgeon-General, ordered that all hospital assistants who had not been examined and approved by the College of Surgeons should be removed. On the day the order was issued Guthrie, confident in his knowledge,

applied for examination, and, two days later, February 5th, 1801, received his diploma. He was not yet 16 years of age. In the following year age became one of the qualifications for the College, and the precedence Guthrie thus gained was afterwards of great value to him, enabling him, when only 38 years old, to take a seat on the Council of the College, an honour never before enjoyed by so young a surgeon. Before his sixteenth birthday, in March, 1801, he was appointed Assistant Surgeon to the 29th Regiment, the Colonel of which was also very young, being but 22 years old. The *Times* said, however, that "notwithstanding the youth of both, it was always admitted that there was no regiment better commanded or doctored." In 1802 the regiment went to Canada, where it remained until 1807, when Guthrie, now Surgeon to the regiment, embarked with it to take part in the proposed expedition for the reduction of Ceuta. The "Dominica," the ship in which Guthrie sailed, was, owing to stress of weather, obliged to put into Gibraltar. Whilst here an extraordinary incident occurred, the watch being asleep, the ship drifted into Algeciras Bay and came under the Spanish guns. Guthrie, who was in his berth, thought the ship's motion unusual, and going up on deck saw that the ship had dragged her anchors. He roused the watch and the ship was got under sail, not, however, before the enemy had opened fire with some 42-pounders, several shots striking the vessel. In tacking the ship had to pass under the guns of another battery, but luckily escaped injury, and got back in safety to her anchorage on the Gibraltar side of the bay.

The Spaniards having rebelled against French dominion, the expedition to Ceuta was abandoned, and the troops landed at the Puerta de Santa Maria, near Cadiz. Guthrie now took up the study of the Spanish language, ultimately becoming a proficient speaker of that tongue. In August, 1808, the whole army was collected together and landed at Mondego Bay, under the command of Sir Arthur Wellesley, and, advancing towards Lisbon, met the French in Battle at Roliça on the 17th of the same month. The greater part of the casualties fell to the 9th and 29th Regiments, and the wounded were for three days after the battle almost entirely under Guthrie's care. He rejoined his regiment on the evening of the 20th. Next day the Battle of Vimiera was fought. A great part of the wounded again fell to Guthrie's care, his regiment having sustained such heavy losses in the two battles that it was sent back again to Cadiz. At Vimiera Guthrie received a severe gunshot wound, but accom-

panied his regiment to Cadiz, and was there in charge of the whole of the sick of the troops under General Mackenzie for several months, during which time he also learnt Portuguese. He then accompanied the Army in the advance on Oporto, and, as no staff-surgeons had yet arrived, Guthrie performed the duties of staff-surgeon in addition to his own during the fighting which occurred before Oporto was taken. At the passage of the Douro he contrived to be the first mounted officer to cross the river, having, thanks to his knowledge of Portuguese, persuaded a Portuguese boatman to take both him and his horse across the river in a country boat. The French had rapidly evacuated the town, and the streets were encumbered with the baggage they had left behind. Guthrie was thus delayed and becoming separated from his regiment, attached himself to Sir J. M. Doyle at the head of the Portuguese regiment, which had crossed the river, and was following the road the English had taken. This road brought them to a precipitous ridge, upon which a British regiment was drawn up with the enemy in their front. The Colonel of this regiment mistook the advancing Portuguese for a French force coming out of Oporto to attack his rear, and made one rank turn about and prepared to fire. Guthrie at once saw the mistake and realised the danger. With a quickness of perception and promptitude of action, which saved many lives, Guthrie tore open his great-coat, thus exposing his red tunic, and held it back. This caused a universal cry to break from the whole regiment, which was about to fire on "the doctor and the Portuguese." The regiment now advanced and Guthrie with it. Guthrie riding forward saw in a narrow lane to his left front a French gun, which the mules attached to it had some difficulty in dragging. The French drivers and artillerymen were dismounting to run away on foot, and Guthrie, the only mounted officer present, galloped to the gun and took possession of it. Not knowing what to do with it Guthrie cut the traces of the leading mule, and, bringing it back with him as a trophy, he sent a serjeant and a file of men to take charge of the gun until he could report the capture to the Colonel of the regiment. Sir J. Sherbrooke, the Colonel, was greatly amused at the surgeon's capturing a gun single-handed. Talavera followed in due time. Here Ferguson, the Deputy-Inspector of Hospitals at Oporto, was Principal Medical Officer. He was an able and efficient officer, and had been recommended for promotion to Inspector-General after Oporto, and Guthrie to Staff-Surgeon. The Board in London,

however, negatived both recommendations. The losses at Talavera were heavy, Ferguson was ill in bed with dysentery, and Guthrie was employed as a sort of staff officer in conveying the necessary orders to the regimental surgeons. Guthrie collected the wounded of his regiment in his own regimental hospital and attended to them himself. The wounded of the other corps were collected together in a general hospital, which was placed under the care of the Staff-Surgeons and Purveyors who came up after the battle was over. When the British were forced to retreat across the Tagus at Arzobespo many wounded were left behind at Talavera, and fell into the hands of the French. They were treated very well. A large number of wounded, however, in dread of becoming prisoners, struggled back with their regiments, and these were afterwards collected together in the large convent of Deleytosa, near Truxillo, where a general hospital was established. The great loss of life which occurred here as a result of bad surgery and want of care caused Guthrie to stigmatise it as "the slaughter-house of the wounded." Amputation was the order of the day, and, as a consequence, many lives and limbs were sacrificed, which under better arrangements might have been saved. Guthrie, whose experience was already considered valuable, thought it his duty to make a formal protest against the removal of several limbs which it had been decided should be amputated. The limbs were saved, but Guthrie, by his expression of opinion, made many enemies in the department. Guthrie accompanied his regiment into quarters in the Pueblo de Calcada, between Merida and Badajos, and here malarial and typhoid fevers broke out amongst the troops; there was a lack of good hospital accommodation, and the loss of life was considerable. It is recorded that the line of graves belonging to Guthrie's regiment was about half that of any other regiment, although he had an equal number of men and sick to look after. At last he himself fell ill with fever when on the march with his regiment, and was left behind at Abrantes to die. He gave up taking bark, the usual remedy, and during the night he tells us he drank two gallons of water, into which a couple of dozen lemons had been sliced. To this he attributed his cure, but he did not completely recover until he had been invalided to England in the spring of 1810. During his illness he had been offered the appointment of Staff-Surgeon, and it was in this rank he rejoined the army in the field at the end of the year at Lisbon, just in time to take part in the pursuit of Massena. He now joined the 4th Infantry Division, under General Sir

Lowry Cole, and accompanied him from the action at Campo Mayor until the end of 1812. This was the most eventful period of Guthrie's life, a period during which his reputation as a surgeon, and, indeed, his after success, became established. He was present at the siege of Olivença, and the two first sieges of Badajos. On one occasion, when riding in front of Badajos, a round shot from the enemy passed between his back and his horse's tail. Guthrie acknowledged the compliment by raising his hat as he galloped out of range. Later, during the third siege, he and the other surgeons of the besieging force slept in front of the spot, and nearer the town, where he had formerly had such a narrow escape. Powder and shot were then much scarcer with the garrison.

At Albuera, the hardest fought battle of the war and the one in which the greatest loss occurred in proportion to the number of troops engaged, Guthrie was the senior surgeon present, and therefore acted as Principal Medical Officer. It is recorded that Guthrie was considered an expert in estimating the strength of the enemy, and had ridden forward at the beginning of the fight to see the numbers of the French manœuvring below. Dr. Sandford, of the 29th Regiment, came to him and asked permission to amputate an artilleryman's leg. Guthrie gave orders that the man should have a tourniquet applied, and be left in a hut until the action was over. Sandford protested that the man wanted his leg off at once, but Guthrie again refused, saying, "Those gentlemen below do not intend to make their real attack here; it will be over there"—pointing to some hills on the right—"where you now see nothing, but if the French get possession, we shall be killed or taken to a man. On those hills the British must win the battle. Do not leave your regiment for an instant, or you will not see it again." Guthrie was correct, a few minutes afterwards the 2nd and 4th Divisions advanced to the hills pointed out, where, finding the enemy already in possession, a terrible struggle ensued. The Fusilier Brigade lost 1,050 men out of a strength of 1,500. The 57th, who here won the title of "Die-hards," lost 23 officers and 400 men out of a total of 570, and the King's colour was shot through in thirty places. Assistant Staff-Surgeon Bolman was killed here by a shot which passed through his chest. Albuera was fought during a thunderstorm attended by torrential rain. It was over by three o'clock.

Guthrie found himself with 3,000 wounded at his feet, only four wagons for their removal, and no surgical equipment other than

that carried by the regimental surgeons in their panniers. The nearest shelter was the village of Valverde, 7 miles away. The surgeons, who had been exposed to the same fatigues and dangers as the regiments to which they belonged, had now, whilst others rested, to turn their attention to the care of the wounded. Many of the wounded lay on the field for three or four days. The serious cases were first removed and soon all were got to Valverde. From five in the morning until eleven at night unceasingly for three weeks the little band of surgeons worked. And their reward was? A severe reprimand from the Adjutant-General who considered that the wounded had been neglected. Guthrie read the Adjutant-General's letter to the wounded officers, who were exceedingly indignant and wrote a long letter denying the truth of the Adjutant-General's communication, also expressing their gratitude in their own names and that of their soldiers for the attention they had received. Guthrie forwarded this with a request that the vilifier of himself and his officers might be punished. The Adjutant-General, whilst objecting to the word "vilifier," refused to name his informant, and stated that the report of neglect did not apply to Valverde. Rewards, promotions, medals, were showered upon the staff and regimental officers, but the medical staff received nothing and only narrowly escaped reprimand.

A winter campaign, which ended in the taking of Ciudad Rodrigo, followed the battle of Albuera. At Ciudad Rodrigo, half the surgical duties fell upon Guthrie, together with the care of the numerous wounded left on the ground after the assault. The Duke of Wellington had a great belief in the general hospital system, and at this time there was in force a general order which directed that all the sick and wounded should be sent to the general hospitals, there to be attended by the general medical staff. Guthrie was strongly opposed to this, being altogether in favour of the regimental hospital system, and in later years was fond of pointing out that whenever the Duke had praised the medical arrangements the Duke's wishes had been disregarded and the regimental system adopted. McGrigor was also opposed to the general hospitals. No doubt they were productive of abuse, many sick and wounded, after recovery, lingering in their convalescent wards instead of returning to duty with their regiments; but to modern ideas it is difficult to understand why it was not earlier recognised that the two should have worked hand in hand and not as opponents to each other. For nearly a hundred years—from Pringle's time until the early part of the nineteenth century—the

controversy amongst medical officers and others continued, and still in any considerable campaign during that period both general and regimental hospitals existed.

After Ciudad Rodrigo, Guthrie had all the sick and wounded placed in regimental hospitals established by the regimental surgeons at Gallegos, Aldea del Obispo, and other villages. This contravention of orders again brought Guthrie in contact with the Adjutant-General, who pointed out that Guthrie's division had more sick with it than any of the others, and that orders had been disobeyed. Guthrie was, however, allowed on this occasion to follow his own plans, but was told that if any evil consequences ensued he would have to take the responsibility. Guthrie discusses the affair in his seventh lecture.

After the taking of Badajos, so graphically described in the pages of Napier, Guthrie had charge of the wounded officers and of 1,200 men, a labour cheerfully undertaken, but which kept him behind his division for some weeks.

The affairs which took place at Castrejon and on the Guarana, in the earlier part of the 1812 campaign, deprived Guthrie of all his transport, and after the battle of Salamanca the medical staff were left with hundreds of wounded on the field without the means of removing one. Guthrie collected in the Convent of San Carlos 300 French wounded who had been abandoned to their fate by the Duke of Ragusa. There they lay on the ground, the living, the dying, and the dead. They ate and drank out of their shoes and hats. The stench was fearful. The Spaniards refused to help them in any way until Guthrie called the Spanish authorities together and told them that unless they gave help at once he would leave a letter for the first French General who came into the town and recommend him to hang them to a man for the outrageous inhumanity they had displayed. As there was a probability of the return of the French, and they were certain that Guthrie meant what he said, they gave in and placed under his orders an alguazil, or police officer. Guthrie assured the alguazil that he would never see his home again unless the wounded were properly cared for. The French wounded were very grateful and drew up a paper expressing their thanks in the strongest terms, acknowledging that officers and men owed their lives to him. One of the French cavalry officers who had been attended by Guthrie was afterwards able to show his gratitude in a practical manner, for, in the following year, Guthrie was taken prisoner by some French cavalry commanded by his former patient who had been exchanged.

Recognition was mutual, and Guthrie was at once set free, receiving also the grateful acknowledgements of the Frenchman for his kindness to their comrades after Salamanca.

After this battle there were many cases of phlegmonous erysipelas amongst the wounded, and Guthrie here introduced the practice of making incisions into the swollen tissues in these cases —a great advance in their surgical treatment.

Guthrie was with the army at Madrid in 1812, and was there appointed to act as Deputy-Inspector of Hospitals, thus becoming the Principal Medical Officer to seven divisions under the command of Lord Hill, a larger number of men than Wellington had with him at Burgos. Guthrie's account of the retreat from Madrid and Burgos, and the wonderful work done by the army surgeons at the time, is worth reading. The reward he received was a refusal by the Medical Board at home to confirm him in his appointment, owing to his youth; others were promoted over his head, ultimately becoming inspectors when on half pay. The result, as far as Guthrie was concerned, was that he thus lost £130 a year for over thirty years.

Guthrie now went to Lisbon, where there were large general hospitals which received the chronic cases of wounds and disease, and all the sick and wounded prisoners of war. He here had considerable scope for his abilities, and when the Duke of Wellington inspected the hospitals he was so pleased that he publicly expressed his approbation of Guthrie's services, and said that, were it not that his present rank debarred him from the appointment, he would like to appoint him surgeon to the headquarter staff.

He was next placed in charge of the large hospital at Santander, which received the wounded from the Pyrenees. This hospital soon contained from 1,200 to 1,400 sick and wounded. At this time he introduced a new system of accounts for the use of regimental hospitals, with the result that the expenses were shown to be much less than those shown by the Purveying Department, whose accounts were made out according to regulation, and which were also subject to audit. Guthrie's accounts were accurate, and the difference appears to have gone into the pockets of the purveyors, one of whom is known to have *saved* £95,000 during the war. Government could not, however, prove peculation, for it had been cheating itself. Many purveyors were, however, dismissed the Service.

At the battle of Toulouse, Guthrie was the only inspectorial officer on the field, and had charge of the wounded in the hospitals in the town after the battle.

On the termination of the war a large number of medical officers were placed on half pay. Guthrie was one of these. In 1814 he returned to London, and, his half pay not being sufficient for his support, he determined to take up private practice. He also diligently attended the surgical lectures of Bell and Brodie at the school in Windmill Street, and of Abernethy at Bart's.

When war again broke out, on the return of Napoleon from Elba, Picton and Sir Lowry Cole both asked Guthrie to join their staffs and live with them at no expense to himself. Guthrie refused. Sir James McGrigor, then Director-General, offered to employ him for six months. Guthrie offered his services for three months, but was refused.

Ultimately he went to Brussels on his own account and acted as consulting surgeon, being heartily welcomed by his former comrades. He performed an amputation at the hip, and tied an artery in the leg through an incision through the calf muscles. Both succeeded. He also removed a bullet from a gun-shot wound of the bladder. After the war, the patients were sent to the York Hospital, which then stood on the site now occupied by part of Eaton Square, and here Guthrie had charge of two wards and gave lectures for two years, illustrated by the cases under his treatment. Guthrie was the first surgeon to use the lithotrite, and, although not the first to do the operation, he was the first to show how excision of the hip might be performed. A very outspoken man, an incautious remark brought upon him attacks in the *Lancet*. Guthrie entered an action for libel, but afterwards withdrew it, and Mr. Wakley having apologised, the two became firm friends.

In 1816 he commenced the series of lectures which he continued for thirty years, and which were open to all medical officers of the Army, Navy, and East India Company as a right. He was appointed on the staff of Chelsea Hospital. In December, 1816, he founded the Westminster Ophthalmic Hospital, to which he was chief surgeon. Elected assistant surgeon at Westminster Hospital in 1823, he became full surgeon in 1827, resigning in 1843 in favour of his son Charles, who was appointed assistant surgeon.

In 1824 he became a Member of the Council of the Royal College of Surgeons, in 1826 was elected Fellow of the Royal Society, and in 1828 became President of the College of Surgeons and one of its examiners. He was Professor of Anatomy from 1828 to 1831. He was dreaded as an examiner, but it is said that he never rejected a candidate by his own unsupported vote. He

brought about many reforms in procedure at the College, raised the standard of education required from candidates for the diploma, and recommended that the College library should be thrown open to the members. He was strongly opposed to the Charter of 1843. It is believed that through him examinations for promotion were instituted. In 1826 he was offered a knighthood by the Duke of York, then Commander-in-Chief, but refused it on the plea of poverty. Guthrie delivered the Hunterian Oration in 1830, which was printed in the *Lancet* of that year.

Guthrie died suddenly of heart disease on May Day, 1856, in London, and was buried at Kensal Green. He was twice married, and by Margaret Paterson, daughter of the Lieutenant-Governor of Prince Edward's Island, he had two sons and a daughter. His elder son, the Rev. Cowry Guthrie, died before him; his second son, Charles, a capable surgeon, died in 1859.

A man of active and robust frame, keen and energetic in appearance, Guthrie had remarkably piercing black eyes. Shrewd and quick, he was at times very outspoken and inconsiderate in speech. But behind his military brusqueness was much kindness of heart. He was very popular as a lecturer, his lectures being full of anecdotes and illustrative cases. As an operator he was noted for his coolness and his delicacy of hand.

Guthrie was known as the "English Larrey," and it is said that no army surgeon, since Wiseman's time, did more to advance the science and practice of surgery. Before his time it was usual to treat gunshot wounds of the thigh by placing the limb on its side. He introduced the straight splint. He differed from Hunter in the treatment of gunshot injuries requiring amputation, advocating primary amputation, whilst Hunter was in favour of the secondary operation. After Albuera, he introduced the practice of tying both ends of a wounded artery at the seat of injury—also contrary to Hunter's teaching. Hunter tied the artery above the injury. Guthrie's experience in the field was certainly very much greater than Hunter's, and Guthrie's practice was soon accepted by the practical surgeons who had gained their experience in the Peninsula. Guthrie advocated the destruction with mineral acids of the diseased tissues in cases of hospital gangrene.

Guthrie's contributions to surgical literature were numerous. In the fourth volume of the *New Medical and Physical Journal*, 1811, appeared his "Observations and Cases of Gunshot Wounds." In 1814 he published his celebrated work on gunshot wounds, dealing particularly with wounds of the limbs requiring amputation.

This was translated into German in 1821. The third edition of this book appeared in 1827 with the title "On Gunshot Wounds, on Inflammation, Erysipelas, Mortification, on Injuries of the Nerves, and on Wounds of the Extremities requiring the Different Operations of Amputation." In 1819 he published a "Treatise on Operations for the Formation of an Artificial Pupil," afterwards embodied in his "Lectures on the Operative Surgery of the Eye," 1823. In 1830 appeared "The Diseases and Injuries of Arteries," dealing especially with the collateral circulation after a main artery had been tied. There followed publications on "Inguinal and Femoral Hernia," 1833; "The Anatomy and Diseases of the Neck of the Bladder," 1834; "The Anatomy and Diseases of the Urinary and Sexual Organs," 1836; "Injuries of the Head affecting the Brain," 1842; and "On Wounds and Injuries of the Arteries of the Human Body, with the Treatment and Operations required for their Cure," 1846. His greatest work, a compendium of his former writings, with new comments, was published in 1853, with the title, "Commentaries on the Surgery of the War, 1808-1815," termed a fifth edition. A sixth edition appeared in 1855, containing comments on the surgery of the Crimean War. This book is a very graphic, highly interesting, and most valuable contribution to military surgical literature. Guthrie presented a copy of it to every regiment in the Service, one to each naval station, and one to the Principal Medical Officer in each Indian Presidency.

In the *Transactions of the Royal Medical and Chirurgical Society* can also be found some "Observations on the Treatment of Syphilitic Diseases without Mercury," a "Letter to the Home Secretary on the Report of the Select Committee on Anatomy," 1829, and "Remarks on the Anatomy Bill," 1832.

[The authorities for the above sketch are: Guthrie's "Gunshot Wounds," 1814, and Commentaries (1853); Biographical Sketch (with portrait) in the *Lancet*, June 15th, 1850; Obituary Notices in the *Times* and *Annual Register;* "Éloge de M. Guthrie par M. Legoust"; "The Dictionary of National Biography," Gordon's "Remarks on Army Surgeons," and a few references in Clarke's "Autobiographical Recollections of the Medical Profession."]

THE SERUM DIAGNOSIS OF SYPHILIS.

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From very early times workers have sought a test by which syphilis may be diagnosed in the absence of classical symptoms, such as the primary chancre, secondary rashes, and such tertiary manifestations as are evidently syphilitic. As is well known, syphilis frequently manifests itself in the most protean manner, and the importance of its recognition must be realised when it is remembered how very intractable are many of the affections which syphilis simulates, and how very amenable to treatment it frequently is when displaying its activity in these forms.

The tests have for the most part been applied to the blood, but previously to the introduction of the Wassermann reaction none of them could claim to be sufficiently specific to be of much value in diagnosis. The fall in hæmoglobin content after the first dose of mercury (Justus), the increase of albumen, changes in the freezing-point and agglutination phenomena, amongst many others, have from time to time been advanced as diagnostic of syphilis, but each in turn has been shown to occur in other diseases, while frequently absent in syphilis itself.

To quite a different category, however, belongs the reaction introduced in 1907 by Wassermann, Neisser and Bruck [1]—a reaction which has been proved by examination of more than thirty thousand blood sera, syphilitic and otherwise, to be so closely specific to syphilis as to be of inestimable clinical value.

Though in its present form the Wassermann test can only be a laboratory procedure, and its performance demands somewhat close attention to detail, the difficulties are by no means insuperable, and particularly abroad, where the worker is not hampered by animal laws, there seems to the writer no reason why advantage should not be taken of its enormous advantages throughout the service. Recognising this, I propose to give such a detailed account of the test as I trust will be of interest and of practical value to the readers of this paper.

It is necessary to preface a description of the serum diagnosis of syphilis by a few remarks on immunity in general, in order that

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[1] Wassermann, Neisser, u. Brück, *Deutsch. med. Woch.*, 1906, No. 19, p. 745.

a clear understanding of the terms used and of the process which occurs may be obtained.

As is well known, many infectious diseases confer a more or less lasting protection against future attacks of the same disease. Inquiry into the nature of this phenomenon led to an investigation into the changes which occurred in the blood as a consequence of infection by the micro-organisms of these diseases, and it has been found that recovery from infection (whether natural or experimental) is accompanied by the production or increase in the blood serum of what appears to be a whole host of substances which have certain properties when brought into contact with the particular infecting micro-organism. These substances have been given different names according to the phenomena which occur when each is brought into contact with the micro-organisms—*e.g.*, agglutinins, which cause clumping of the specific micro-organisms; bactericidal substances, which kill them; bacteriolytic substances, which dissolve them; opsonins, and others. The whole of these substances are grouped together under a common name—antibodies. The micro-organisms, which by invasion of the tissues give rise to the production of antibodies, are called "antigens."

The term "antigen" embraces many other bodies besides micro-organisms. Thus toxins, the product of micro-organisms, act as antigens when they give rise to the production of the antibodies called antitoxins; certain vegetable substances, such as ricin and abrin, can act as antigens and cause the production of antiricin, &c.

In general also, it may be said that the tissue-cells of any animal act as antigens when introduced into the body of an animal of another species, and give rise to the production of specific antibodies, *i.e.*, bodies which are antagonistic to the particular foreign cells which have been introduced. The term "antigen" therefore indicates any substance, whether it be organised protoplasm or otherwise, the introduction of which gives rise to the production of antibodies.

It is necessary for the purpose in view to describe first the phenomena which occur when the antibodies to which the affix "lytic" is applied are brought into contact with their specific antigens.

The action of "lytic" bodies was first well exemplified by the well-known Pfeiffer's phenomenon. In this, which was the foundation of a great deal of valuable work on the subject of immunity, it will be remembered that when an animal, *e.g.*, a guinea-pig, has been immunised against cholera vibrios by suitable injections of the

latter at intervals, the introduction of the vibrios into the peritoneal cavity of the immunised guinea-pig is followed by their becoming motionless, then spherulating, and finally completely dissolving. The same phenomenon can be observed *in vitro* when a little of the immune animal's fresh serum is added to the cholera germs and the whole incubated for a short time at 37° C.

A similar phenomenon, very pertinent to this subject, occurs as the result of injecting the blood cells of one animal into an animal of another species. In course of time the blood serum of the injected animal acquires the power of dissolving the red blood cells of an animal of the species which provided the cells injected. When the two (serum and blood cells) are put together in a test tube and kept in an incubator at 37° C. for a short time, the hæmoglobin is dissolved out of the red cells and the mixture becomes a transparent red fluid. Within certain limits this action is specific—*i.e.*, the antibody (in the serum) acts only on the particular antigen (cells) which gave rise to its production: *e.g.*, if a guinea-pig is immunised by injections of the ciliated epithelium of the trachea of an ox, its fresh serum will eventually dissolve ox trachea ciliated epithelium, but not ox spermatozoa or kidney cells, though, curiously, it will dissolve ox red cells.

Further analysis of this property by which the serum of an animal immunised against a particular cell can dissolve that cell *in vitro* at body temperature, revealed certain very interesting facts of great importance to the present subject, and these may be better illustrated by examples.

If the washed red cells (*i.e.*, red corpuscles freed from serum by repeated centrifuging and resuspending in salt solution) of a sheep are injected at suitable intervals and in suitable quantities into the body of a rabbit, whether intravenously, subcutaneously, or intraperitoneally, in course of time the blood serum of the rabbit develops antibodies specific to the antigen used—the sheep cells—so that when this rabbit's fresh serum is brought into contact with the red blood cells of a sheep and the whole incubated at 37° C., hæmolysis or solution of the red cells occurs. This occurs, however, only when the serum is fresh and unheated. If the serum be allowed to stand for a number of days (generally over three), it gradually loses its power of dissolving sheep cells. Further, if it be heated at 55° C. for half an hour, it loses this power at once.

If such stale or heated serum be put in contact with sheep red cells and the whole incubated for any time, no release of hæmoglobin occurs, and, in fact, apparently no change occurs; one could

examine such cells microscopically and detect no difference. A change has occurred, however, as is rapidly shown by adding any fresh serum. If any fresh blood serum (*e.g.*, a guinea-pig's) be added to these sheep cells which have been in contact with the immune rabbit's serum (generally referred to as sensitised cells), and the whole incubated at 37° C. for an hour, hæmolysis occurs. If such fresh normal serum be added to sheep cells which have not been in contact with the immune rabbit serum, no solution occurs.

Further, if the guinea-pig serum be allowed to stand for some days, or be heated at 55° C. for half an hour, and then be added to the sheep cells which have been in contact with the immune rabbit serum, no further change occurs. It is thus seen that the immune rabbit serum in the process of heating or becoming stale loses one property, which is necessary for the completion of its action on the sheep cells; or, in other words, certain molecules in it which are necessary to its complete action are destroyed. It is further seen that on heating or standing it does not lose the whole of its property of dissolving the cells, because addition of any fresh serum, which of itself cannot dissolve sheep cells, results in hæmolysis. It is, therefore, legitimate to infer that the substances in it which are destroyed by heat or by standing are also present in every fresh serum. These thermolabile substances are known from the nature of their action as complement (Ehrlich); other names given to the same substances are alexine (Bordet) and cytase (Metchnikoff), but they will be referred to here as complement.

Those other substances which it will be remembered were still left intact after heating and standing, which could not act of themselves, but whose action was completed by the addition of complement, are known as immune body, substance sensibilisatrice (Bordet), or amboceptor (Ehrlich)—names given by different workers according to the conception of each as to its manner of action. Without committing ourselves to any opinion on this question, the name "amboceptor" or antibody will be used in this instance.

If one conceives a given quantity of any serum as containing so many molecules of complement and so many of amboceptor, one obtains a mental picture which assists in the understanding of other points which are necessary to the formation of a clear idea on this subject. In the process of immunising an animal by the injection of an antigen, do the molecules of amboceptor and of complement both increase in number, or only those of amboceptor? One can say definitely that for all practical purposes connected with this subject, only the molecules of amboceptor increase in number.

The question of increase of complement in the process of immunisation is a disputed one, but if increase does occur it is so small in comparison with that of amboceptor that it may be neglected here.

An estimate of the amount of amboceptor in a serum is obtained by a process of titration, an operation much in use in the Wassermann reaction. Supposing that, given the presence of sufficient complement, it required 500 million molecules of amboceptor to cause solution of 1 cc. of a 5 per cent. suspension of sheep cells, and that this quantity of amboceptor were contained in 1 cc. of heated rabbit serum ten days after an injection of washed sheep cells, then 1 cc. of the heated rabbit serum and sufficient complement would hæmolyse 1 cc. of 5 per cent. sheep cells.

After a series of injections it would be found that the number of molecules of amboceptor per cubic centimetre of the rabbit serum had increased enormously, so that 1 cc. of the serum might easily contain 2,000 × 500 million molecules of amboceptor; $\frac{1}{2000}$ cc. of this serum would dissolve 1 cc. 5 per cent. suspension of sheep cells, given sufficient complement, or 1 cc. of the serum would contain enough molecules of amboceptor to dissolve 2,000 cc. of the 5 per cent. suspension. Such an occurrence is quite common.

If the complement of the rabbit serum be similarly titrated before and after the process of immunisation, it is found that little, if any, increase has occurred in the number of molecules per cubic centimetre. In fact, one would find that normal guinea-pig serum would be much richer in complement than the immunised rabbit's fresh serum, and would act in smaller quantity with the immune rabbit's amboceptor than would the same rabbit's complement. The amount of amboceptor which, in combination with excess of complement, is just sufficient to hæmolyse completely 1 cc. of a 5 per cent. suspension of cells is known as the minimum hæmolytic dose of amboceptor, or shortly, one dose, so that if $\frac{1}{2000}$ cc. of heated immune serum dissolved 1 cc. of 5 per cent. suspension of sheep cells (in presence of excess of complement), then $\frac{1}{500}$ cc. would be referred to as four doses of amboceptor.

Similarly in the case of complement, if $\frac{1}{100}$ cc. fresh guinea-pig serum were just sufficient to hæmolyse 1 cc. of the 5 per cent. suspension of blood cells in presence of excess of amboceptor, then $\frac{1}{10}$ cc. of the same serum would be referred to as ten doses of complement.

Another point to bear in mind is this, that a minimum hæmolytic dose of amboceptor will not produce complete lysis of 1 cc. 5 per cent. cells in combination with a minimum hæmolytic dose of

complement, and *vice versa*. On this account, it is usual, when testing for the amount of amboceptor in a given serum, to use ten doses of complement, and similarly, when titrating a fresh serum for complement, two, four, or even eight doses of amboceptor are added.

The relations which the various substances concerned in a lytic process bear to one another is of importance. If fresh normal guinea-pig serum (*i.e.*, complement) be added to sheep cells, and the mixture after standing at 37° C. for one hour be then centrifuged, the supernatant fluid pipetted off, the cells resuspended in 0·8 per cent. salt solution, and the process repeated several times; or, in other words, if the sheep cells be washed, and amboceptor (heated immune serum) be added to the washed cells, no visible effect occurs, indicating that the complement did not attach itself to the cells, but remained in the supernatant fluid which was pipetted off.

But if, on the other hand, heated immune serum be added to the cells and, after allowing time (an hour) for combination, the cells be washed and, finally, complement be added, hæmolysis occurs. This indicates that the amboceptor did attach itself to the cells.

The process is graphically represented by Ehrlich, and, though one may not agree with his conception of the process in detail, it serves to form a helpful mental picture of the process.

According to Ehrlich, the cell has a process or group with an affinity for the amboceptor, which thereby becomes attached to it by its special arm. On the other hand, the amboceptor has another arm by which it attaches the complement. The latter is supposed to consist of two parts—one grasps the amboceptor, the other acts on the cell and dissolves it. Fischer's conception is useful if taken with the same reservation. The cell is conceived of as a highly superior lock, amboceptor as the very special key which fits that lock, and complement as the hand (any hand) which turns the key and opens the lock. It illustrates the specific nature of amboceptor and the non-specific nature of complement.

From the above it will be now clear that an antigen combines with its specific amboceptor (or antibody), and the combination has the property of attaching to itself complement.

The question arose as to whether complement was specific or not; in other words, whether the complement which effected bacteriolysis was the same substance as that which effected hæmolysis, or were the two different? On the one hand, Ehrlich maintained that they were different, while Bordet held just as strongly that complement was non-specific. Each maintained his

point with a long series of experiments of the most ingenious nature, and one of these resulted in the establishment of the Bordet-Gengou phenomenon[2] which was designed to show that complement is non-specific, and was the basis on which the Wassermann reaction was founded. It illustrates again the fact that a research in pure science, which appears to the "practical commonsense" person to be a mere waste of time, frequently leads to results of the utmost practical value.

The Bordet-Gengou phenomenon is as follows:—

If an animal be immunised against a pathogenic micro-organism, *e.g.*, cholera, and if then its heated serum (amboceptor), cholera vibrios (antigen), and fresh normal serum (complement), be put together and incubated at 37° C., the antigen, antibody, and complement will unite, and at the end of the period of incubation no complement will be left free (provided, of course, that no more complement has been added than is sufficient to satisfy the antigen-antibody combination).

The proof of this is simple. All that is necessary is to add a reagent which will detect the presence of free complement. Such a reagent will suggest itself from what has been written. It will be remembered that the addition of heated antisheep cell serum to sheep cells produced no visible effect, but that the further addition of complement caused hæmolysis. Obviously, therefore, if these sensitised cells, as they are called, be added to the cholera vibrio-anticholera serum-complement combination, after the necessary incubation, no hæmolysis would occur; proving that no free complement was present. But if anticholera serum, typhoid bacilli, and complement were mixed and incubated, and then the reagent (the sensitised cells) added, the case would be different. Anticholera serum is not the specific amboceptor for typhoid bacilli, so no combination of complement would occur; the latter remaining free, hæmolysis would occurr when sensitised sheep cells were added.

Similarly, supposing the serum of a patient suffering from typhoid fever be taken about the fourteenth day and divided into three parts after heating at 55° C. for half an hour to destroy its natural complement, and to one part were added gonococci and complement (fresh guinea-pig serum), to another cholera vibrios and complement, and to the third typhoid bacilli and complement. Then that the whole were incubated for a couple of hours and the reagent added to each. From the Bordet-Gengou phenomenon, one can

[2] Bordet et Gengou *Annales de l'Inst. Pasteur*, 1901, p. 290; *ibid.*, 1902, p. 731.

predict that hæmolysis would occur in the first two, but not in the third tube.

It will thus be seen how the Bordet-Gengou phenomenon can be applied to the testing for the presence of a particular antibody in any blood serum ; for the addition of a known antigen to such a serum will demonstrate, by the occurrence or not of deviation (binding) of complement, whether that antigen has found in the serum its corresponding antibody or not.

It was quickly found that the same binding of complement occurred when a serum antigen was put in contact with its corresponding antiserum, and complement added, and the test is an exceedingly delicate one for blood stains.[3] Wassermann and Brück[4] then found that not only micro-organisms but extracts of these could be used as antigen, and thereby the phenomenon became a convenient one for demonstrating the presence of antibodies in patient's blood—*e.g.*, in cerebro-spinal meningitis, cholera, tubercle, &c. Finally, in 1906, Wassermann, Neisser and Bruck[5] introduced their method for the demonstration of specific antibodies in the blood of syphilitic patients. Cultures of *Spirochæta pallida* being impossible, use was made of Wassermann and Bruck's discovery—that extract of micro-organisms will act as antigen. It will be remembered that the liver of an infant suffering from hereditary syphilis is frequently so stuffed with spirochætes that it is really a strong culture of the organism. Wassermann, Neisser and Bruck accordingly argued that a watery extract of such a liver would also be an extract of *S. pallida*, and as such could be used as antigen for the detection of antibody in the blood of patients suffering from syphilis, on the principle of the Bordet-Gengou phenomenon.

Experiments on apes by injecting them with this watery extract showed that antibody was produced so that the blood serum of such apes would unite *in vitro* with the extract to form a combination with an affinity for complement. The blood serum of normal apes, on the other hand, showed no such affinity.

These experiments were rapidly followed by examination of the blood serum of syphilitics for the presence of syphilitic antibody, and it was found that in a large number of cases syphilitic serum, placed in contact with watery extract of syphilitic fœtus liver

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[3] Neisser u. Sachs, *Berl. klin. Woch.*, 1905, vol. 42, p. 1388; *ibid.*, 1906, vol. 43, p. 67.

[4] Wassermann u. Bruck, *Deutsch. med. Woch.*, 1906, No. 12, p. 449.

[5] Wassermann, Neisser, u. Bruck, *Deutsch. med. Woch.*, 1906, No. 19, p. 745.

(antigen), behaved in the same manner as any other antigen-antibody combination in binding to itself complement. Normal serum, on the other hand, formed no combination with antigen and left the complement free.

Naturally, in such an experiment, it is necessary to use definite quantities of the constitutents of the test.

The antigen-antibody combination would bind to itself a certain amount of complement, but if excess of the latter over the capacity of the antigen-antibody combination were added, it would be left free, and, on addition of the reagent, hæmolysis would occur.

A simple example of such an experiment may be useful at this stage.

Constituents of the test :—

(1) Antigen, watery extract of liver of a syphilitic fœtus.

(2) Complement, fresh guinea-pig serum; as a rule this, when fresh, works at $\frac{1}{100}$, or, in other words, 0·01 cc. is sufficient to hæmolyse completely 1 cc. of a 5 per cent. suspension of blood cells to which excess of hæmolytic amboceptor has been added.

(3) Syphilitic serum, to be tested for presence of antibody.

(4) Normal serum, control.

(5) Sensitised sheep corpuscles—*i.e.*, a 5 per cent. suspension of washed sheep corpuscles in 0·8 per cent. salt solution, to which at least two doses of hæmolytic serum have been added.

Five small test tubes are taken and marked in any convenient manner—*e.g.*, A, A′, B, B′, C. Into A and A′ is put 0·2 cc. syphilitic serum. Into B and B′ is put 0·2 cc. normal serum. Into A, B, and C is put 0·2 cc. extract, and into each tube is put 0·1 cc. complement.

It is thus seen that A′ and B′ differ from A and B in containing no extract. They are used to show that serum alone will not bind the complement, while C tube, which contains no serum, is a control to show that extract alone will not bind complement.

The quantity in each tube is made up to 1·5 cc. by addition of 0·8 per cent. NaCl solution, and all five tubes are put into an incubator at 37° C. for an hour and a half. At the end of this time they are taken out, and it then becomes necessary to find in which tube the complement remains free and in which it has been bound. The reagent is accordingly added to each in the shape of 1 cc. sensitised red cells, and the tubes are put back into the incubator. At the end of a short time (varying from fifteen to sixty minutes) it is found that hæmolysis has occurred in every tube except A—the tube containing syphilis serum and extract (antigen). In A tube alone, therefore, has the antigen found its corresponding antibody, and the complement consequently been bound.

The natural inference from such an experiment as the above, and from many others which showed it was only in the tubes containing syphilitic serum and syphilitic liver extract that the complement was bound, was that the serum of a large proportion of syphilitics contains anti-spirochæte substances which can be detected by the Bordet-Gengou phenomenon.

It was then pointed out by Levaditi and Marie[6] that extracts of certain normal organs could act with syphilitic serum in a manner similar to extract of syphilitic fœtus liver; and this observation was quickly confirmed by Landsteiner, Michaelis, and many others. At the same time, however, it was shown that these watery extracts worked in a more feeble manner than those of syphilitic organs containing the spirochætes.

Bruck[7] then showed that if the normal organ were extracted with $\frac{1}{5000}$ to $\frac{1}{10000}$ solution of normal K.O.H. solution, the deviating power of the extract became equal to that of syphilitic organs.

It has since been found that alcoholic extracts of normal organs possess this deviating power to a high degree when in contact with syphilitic serum, and it is, in fact, the practice in many laboratories now to use these alcoholic extracts instead of watery extracts of syphilitic and other organs.

In addition to these, it was further discovered that a number of lipoid substances, *e.g.*, lecithin,[8] oleate of soda,[9] oleic acid, cholesterin,[10] and glycocholate of soda,[11] could act as "antigen" in this reaction.

Evidently when extracts of normal organs and solutions of lipoids are used, the reaction is not an antigen-antibody combination in the Bordet-Gengou sense, and the question arises whether the combination of watery extract of syphilitic organs can be interpreted in this sense, or in that of the unknown principle which underlies the combination of syphilitic serum with liquids or alcoholic extracts of organs.

The earlier experiments of Wassermann, Neisser, and Bruck would indicate that watery extracts of syphilitic organs find a true antibody in syphilitic serum, while alcoholic extracts and lipoids

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[6] Marie et Levaditi, *Annales de l'Inst. Pasteur*, 1907.
[7] Bruck, "Die Serodiagnos. der Syphilis," Berlin, Springer, 1909, p. 9.
[8] Porges u. Meier, *Berl. klin. Woch.*, 1907, vol. 44, p. 1599.
[9] Sachs u. Altmann, *Berl. klin. Woch.*, 1908, p. 494.
[10] Fleischmann, *Berl. klin. Woch.*, 1908, p. 490.
[11] Levaditi et Yamanouchi, *C. R. de la Soc. de Biol.*, 1907, p. 740.

find another body which exists in addition to true antibody, and that the combination of these other substances with the lipoid has a similar affinity for complement to that possessed by antigen-antibody. Much work remains to be done before this question can be settled.

It would be out of place in a paper of this nature to enter upon any lengthy discussion of the nature of these substances and the manner in which, combined with lipoid substances, they bind complement.

Noguchi[12] showed that sera which had a high globulin content gave the reaction in proportion to the amount of globulin they contained, while Klausner,[13] observing a precipitate to occur on the addition of distilled water to syphilitic serum, also holds to the substance being a globulin.

Wassermann, noting its affinity for lecithin, suggested that the substance might be a toxin with a great avidity for lecithin, and it has been suggested that it is this affinity which may be the cause of tabes and of general paralysis, in that the toxin circulating in the blood tears from the central nervous system the lecithin which is such an important constituent of nerve tissue.

Regarding the manner in which complement is bound in this reaction, Fornet and Scherewsky[14] showed that a precipitate forms on the addition of syphilitic serum to syphilitic organ extract. Porges and Meier[15] demonstrated a similar precipitate on contact of syphilitic serum with solution of lecithin, while Sachs and Altmann[16] showed the same phenomenon with oleate of soda. Elias, Neubauer, Porges, and Salomon,[17] as the result of a carefully conducted research, concluded that precipitation and complement deviation reactions in syphilis depended on interaction of colloids, and that the bodies in syphilitic sera which gave precipitation and complement deviation reactions with lipoids were albumens in an unstable condition.

They pointed out that syphilitic sera differ only from normal in that the zone of precipitation is considerably broader in the case of the former, while complement deviation occurs also in the case

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[12] Noguchi, *Journ. Exp. Med.*, January, 1909.

[13] Klausner, *Wien. klin. Woch.*, 1908, Nos. 7 and 11.

[14] Fornet u. Scherewsky, *Berl. klin. Woch.*, May, 1908.

[15] Porges u. Meier, *Berl. klin. Woch.*, 1908, p. 731.

[16] Sachs u. Altmann, *Berl. klin. Woch.*, 1905, p. 494.

[17] Elias, Neubauer, Porges u. Salomon, *Wien. klin. Woch.*, 1908, pp. 376, 652, 748.

of normal sera, though to a much less extent. Unheated sera give heavier precipitates and deviate more strongly than sera which have been heated to 55° C. for half an hour, while acids increase and alkalis diminish both reactions.

Against this close parallelism between precipitation phenomena and complement deviation, however, Porges and Meier and Klausner have shown that, while precipitation with lipoids is by no means specific for syphilitic sera, the complement deviation is very closely so.

The whole question is by no means settled, and is one on which it is impossible to offer any opinion at present, but it may, I think, be safely assumed that, granting the presence of a true antibody, there is also in syphilitic serum a body which, while present also in normal serum to a slight amount, exists in the former in quantities which are easily detectable. An important fact which depends on this is that the presence of this body, as detected by the usual Wassermann test, does not indicate the high resistance to which the individual has attained, but the perverted and abnormal condition of his tissues.

The amount of this perversion and abnormality would on this reasoning be an index of the activity of the invading parasite, and the Wassermann reaction should therefore be a guide to the value or otherwise of the various lines of treatment designed to destroy that activity.

The Specificity of the Wassermann Reaction.—It would naturally be expected from the above considerations that, as the substance in syphilitic serum which causes deviation of complement is not an antibody specific to the *Spirochæta pallida*, it is not specific to syphilis, but likely to be found in sera of normal persons, or, at any rate, in other diseases.

Fortunately, as will be shown, this is not the case to an extent which seriously affects the clinical value of the reaction. In this connection I cannot do better than quote the statistics collected by Carl Bruck.[18]

Including 2,856 cases of his own, this author gives particulars of 14,529 cases whose blood serum was examined in this way. Of the 5,028 included in these, who were suffering from other diseases and denied having suffered from syphilis, 59 gave a positive reaction. Included in these were 3 moribund cases, 5 cases of tuberculosis, 4 tumours, 2 cases of leprosy, 1 yaws, 1 scarlet fever,

[18] Bruck, *loc. cit.*, pp. 41-45.

1 deaf mute (probably hereditary syphilis), 1 multiple sclerosis, 1 paralysis, 4 cases of pneumonia, 2 cases of typhoid fever, 1 herpes, 2 aortic disease, 1 gonorrhœa, and 1 paraphimosis, while of the remaining 24 cases, in 5 the reaction was incomplete, in one the serum a few days later gave a negative reaction, and one was proved later to have had syphilis a long time previously.

In reference to the moribund cases, Geheimrat, Ponfik and Professor Winckler[19] showed that of 101 specimens of serum from cadavera, 59 gave a positive reaction, and it is probable that the substances producing this phenomenon are elaborated immediately before death in very many cases.

Respecting the cases of tuberculosis and of tumours, Seligmann and Blume[20] show that in diseases accompanied by great wasting there is a tendency to give a positive reaction to this test.

Granting the occasional positive reaction in moribund cases, in late tuberculosis, in tumours with wasting, and in pneumonia, six diseases require special mention and their position clearly defining in regard to this reaction. They comprise practically the whole of the remaining diseases in which a positive reaction has on occasions been obtained. They are yaws, scarlet fever, leprosy, trypanosomiasis, remittent fever, and malaria.

In yaws, Bruck,[21] and Hoffmann and Blumenthal[22] report positive reactions occurring sufficiently constantly for remark. The clinical resemblance between yaws and syphilis, and the close resemblance which their respective micro-organisms bear to one another make it very probable that the two are closely allied diseases, though Neisser's[23] experiments have shown them to be different. They recall the relationship between typhoid and paratyphoid infections. In trypanosomiasis, Landsteiner, Müller and Poetzel[24] have shown that the sera of rabbits infected with *Trypanosoma equiperdum* and *T. gambiense*, respectively, gave a positive reaction. Scarlet fever is of more clinical interest in this respect on account of its similar pandemicity to syphilis, and the possibility that, on occasion, the two diseases might be confused.

Much and Eichelberg[25] first pointed out that 40 per cent of

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[19] Quoted by Bruck, *loc. cit.*
[20] Seligmann u. Blume, *Berl. klin. Woch.*, 1909, p. 1116.
[21] Bruck, *loc. cit.*, p. 50.
[22] Hoffmann u. Blumenthal, *Dermat. Zeitschr.*, 1908, p. 23.
[23] Neisser, "Die Experiment. Syphilis," 1906, Berlin.
[24] Landsteiner, Müller u. Poetzel, *Wien. klin. Woch.*, 1907, No. 46.
[25] Much u. Eichelberg, *Med. Klin.*, 1908, pp. 500, 671.

their cases of scarlet fever gave a positive reaction. Their observation naturally created considerable interest, and bacteriologists immediately set to work to test its truth. In 203 cases, investigated in various laboratories by Schleissner,[26] Jochmann and Topfer,[27] Meier,[28] Höhne,[29] and Boas and Hauge,[30] only one positive result was obtained. Further, Zeissler[31] in Much's laboratory obtained only three positive reactions in forty-two cases.

Seligmann and Klopstock[32] investigated thirteen cases of scarlet fever, and at first obtained negative results, but suddenly the sera of their cases of this disease began to give positive reactions with the same extract. Further investigations showed that this extract had commenced to give positive reactions with several normal sera and had therefore become useless for the test. These workers suggested that Much and Eichelberg's reactions might have been obtained with a similar extract.

Considerable light was thrown on the question by Halberstädter, Müller and Reiche,[33] who showed that while one extract might give a positive reaction with a high percentage of scarlet fever cases, another would give persistently negative results, both extracts being of apparently equal deviating power when used with syphilitic sera, and never showing a positive reaction with any normal serum. Brück and Cohn[34] were able to confirm this observation. They used eight different alcoholic extracts, all well accredited by numerous tests on syphilitic and normal sera, and found that while four of the extracts failed to react with scarlet fever serum, one gave five positive reactions out of eleven tests, a second, two positives out of twenty-two, and a third, one positive in fourteen.

These discoveries appear to afford an ample explanation of the results published by Much and Eichelberg.

Further investigations on the reaction in scarlet fever by Foa and Koch[35] gave negative reactions in fifty-nine cases, while Hecht, Lateiner and Wilenko[36] in 119 cases obtained three positive

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[26] Schleissner, *Wien. klin. Woch.*, 1908, No. 40.
[27] Jochmann u. Topfer, *Munch. med. Woch.*, 1908, p. 1690.
[28] Meier, *Med. Klin.*, 1908, No. 36.
[29] Höhne, *Berl. klin. Woch.*, 1908, No. 38.
[30] Boas u. Hauge, *Berl. klin. Woch.*, 1908, No. 34.
[31] Zeissler, *Berl. klin. Woch.*, 1908, p. 1887.
[32] Seligmann u. Klopstock, *Berl. klin. Woch.*, 1908, No. 38.
[33] Halberstädter, Müller u. Reiche, *Berl. klin. Woch.*, 1908, No. 43.
[34] Bruck u. Cohn, *Berl. klin. Woch.*, 1908, No. 51.
[35] Foa u. Koch, *Wien. klin. Woch.*, 1909, No. 15.
[36] Hecht, Lateiner u. Wilenko, *Zeitschr. für Immunitat*, 1909, p. 356.

reactions, including two with sera of cadavera, and one in a case of severe uræmia.

All workers are agreed that in any case the reaction rapidly disappears in the case of scarlet fever, and it is therefore clear that, with the knowledge of the facts above related, the case of scarlet fever need present no difficulty to the pathologist in his interpretation of results by the Wassermann reaction.

In cases of leprosy, Eitner,[37] Wechselmann and Meier,[38] Slatineano and Danielopol,[39] and others, have shown that in a very high percentage of cases, the sera not only give the complement deviation with leprosy extracts, but with extracts identical with those used for the reaction in syphilis.

Most of the workers agree that it is chiefly in the tubercular form that the reaction is given. An important point (pointed out by G. Meier) by which leper serum can be distinguished from syphilitic serum is that the former gives complement deviation with tuberculin as well as with the extract used in the syphilitic reaction, while syphilitic serum does not react with tuberculin.

In malaria, Boehm[40] announced that he obtained 35·5 per cent. of positive reactions. This occurred only in early cases and disappeared under treatment with quinine.

In relapsing fever, Korschun and Leibfreid [41] obtained twenty-seven positive reactions in fifty cases. The serum of relapsing fever cases, however, gives a positive reaction with extract of relapsing fever liver in strengths of the latter which are considerably less than those of syphilitic extracts, which are necessary to produce the reaction.

(*To be continued.*)

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[37] Eitner, *Wien. klin. Woch.*, 1908, p. 729.
[38] Wechselmann u. Meier, *Deutsch. med. Woch.*, 1908, No. 31.
[39] Slatineano et Danielopol, *C. R. de la Soc. Biol.*, 1908, pp. 528, 530, 702.
[40] Boehm, *Malaria*, 1909, pp. 191-197.
[41] Korschun u. Leibfreid, *Deutsch. med. Woch.*, No. 27, p. 1179.

THE *ROLE* OF THE CLEARING HOSPITAL.

By Lieutenant-Colonel M. W. RUSSELL.

Royal Army Medical Corps.

"The medical service in the field is based on the system of evacuating sick and wounded."—Field Service Regulations, Part 2., Chap. X., Sect. 74.

"The Clearing Hospital is the pivot upon which the whole system of evacuating sick and wounded turns.

"Clearing Hospitals are normally located at an advanced base.

"It is their business to push up thence to within reach of the Field Ambulances and enable these to follow up the army, by relieving them of their sick and wounded as soon as possible.

"Having relieved the Field Ambulances of their patients, the next duty of the Clearing Hospitals is to pass them on to the Stationary Hospitals on the line of communication, so that they themselves may not be clogged. When operations are taking place at a distance from railhead, it will probably be necessary for them to form a series of intermediate resting-places, a day's march, or less, apart, between the army and the advanced base or the railway.

"The necessary transport for conveying the sick and wounded back to the Stationary Hospitals or to the railway will be provided under arrangements made by the Director of Transport and the Inspector-General of Communications.

"The empty wagons of supply columns and parks returning to replenish at the advanced base may be utilised for this purpose. Transport, in addition to these vehicles, will probably be necessary, especially after an action, and will be provided by hire or requisition, or specially organised sick and wounded convoy sections attached to the Clearing Hospitals.

"The following principles may be assumed:—

"(1) That the ambulance wagons of Field Ambulances or Cavalry Field Ambulances must never be detached to such a distance as would prevent them rejoining their unit the same day.

"(2) That during periods of marching or halting a steady inflow to the Field Ambulances of about 0·3 per cent. occurs daily, and that, consequently, a similar outflow from the Field Ambulances to the Clearing Hospitals, and from the latter to the Stationary Hospitals, must be anticipated."—Field Service Regulations, Part 2, Chap. X., Sect. 78.

The above extracts from Field Service Regulations show that the *rôle* of the Clearing Hospital is a compound one.

Its functions may be divided into:—

(I.) Battle functions, and

(II.) Those performed in the intervals between engagements.

The former are the most intensive and, perhaps from the purely militant standpoint, the most important, everything which tends to the gaining and making good success in battle being necessarily transcendent in war. But when we come to consider the relatively small proportion of time spent by troops on campaign in the

clash of conflict, and the relatively long time necessarily passed in preparation for, or in recuperation after, the encounter, it will readily be granted that the work done in the latter and longer period is not without grave importance too, inasmuch as its efficient or non-efficient performance must, and does, react on the work done in the crucial struggle.

(I.) The battle function of the Clearing Hospital is to be at hand on the eve of an engagement to join up with the Field Ambulances. It may then have to do one of two things:—

(1) In the event of the army being successful and driving the enemy from the field, it should push right up to the Field Ambulances and take over their wounded on the spot, freeing them to follow their divisions; or

(2) If the army has been unable to do more than hold its ground, or has had to give way, it should co-operate with the Field Ambulances in evacuating their wounded, and pass them, with the utmost rapidity possible, back to the line of communications.

To enable it to perform either of these functions it should be within a day's march of the field when the fight commences, if possible about 8 or 10 miles away. Its position should be made known to the troops in operation orders. One of the most striking observations in the reports of the medical attachés in Manchuria is the very large proportion of lightly wounded who found their own way back on foot to the medical formations in rear of the Field Ambulances without troubling the latter.[1] The Field Ambulances will have their hands very full in a big engagement, and any measure which will deflect round them those of the wounded who are not in immediate need of their ministrations is worthy of consideration. There is a further point. It is not open to doubt that in order to evacuate the wounded after a big engagement a large amount of transport will be required. Empty supply wagons may provide a little, but that can only be a tithe of what is wanted; moreover, the supply wagons may, and probably will, not be empty, if they are required to follow up in a pursuit; the vehicles of the Field Ambulances are not available for

[1] Among the Russians at the battle of Mukden a large number of the less severely wounded avoided the dressing stations and made their way directly back to the Stationary Hospitals or to the railway line. Out of a total of 29,973 wounded in the 1st, 3rd, 6th, and 9th Siberian Divisions, only 9,856 were dealt with by the Field Ambulances, the bulk of the remaining 20,000 found their own way back. The Field Ambulances were from 2 to 3 kilometres behind the firing line, and the hospitals were from 8 to 15 kilometres further back still.

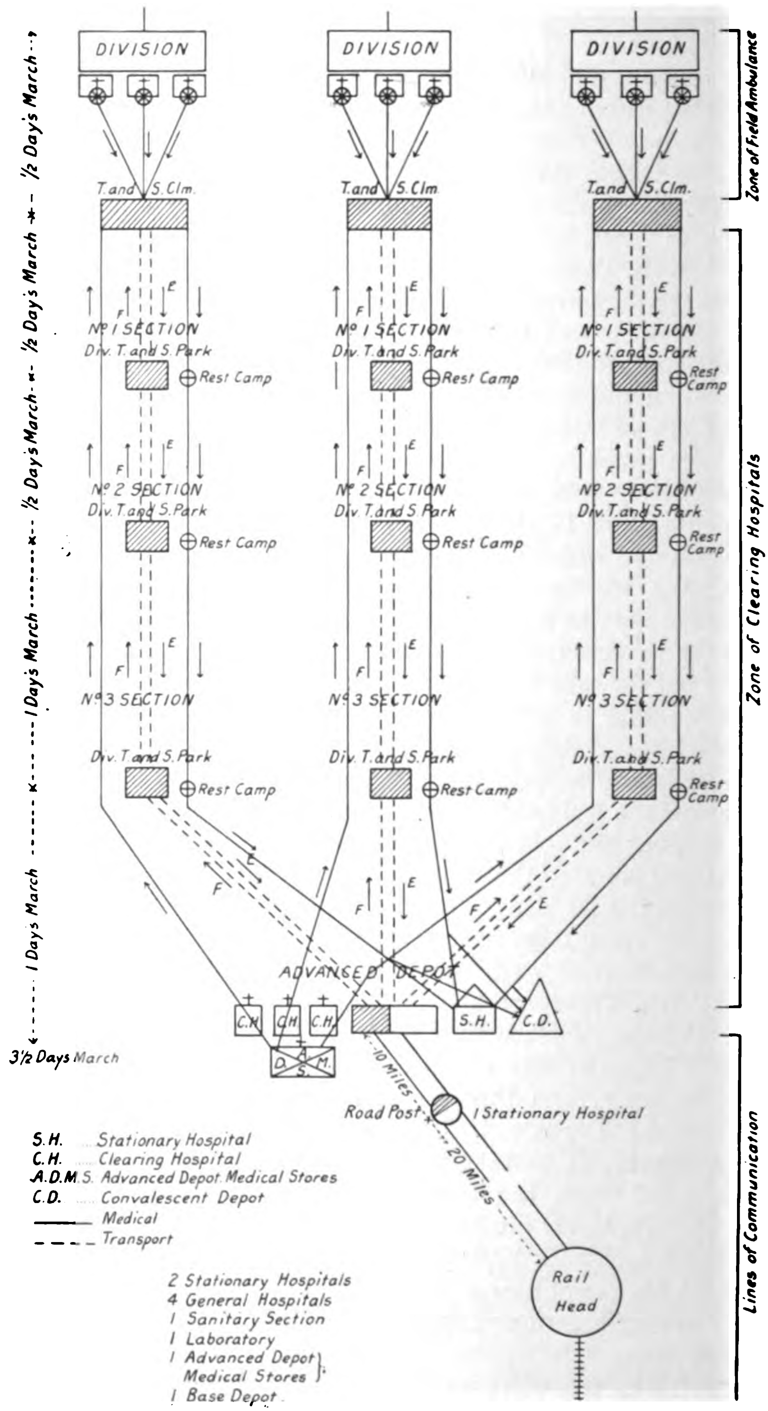
similar reasons, and other transport must be largely relied on. In the Austro-Hungarian Army, we are told by Ritter von Hoen, fighting units are directed, on the eve of an engagement, to impress all vehicles within their area and hold them for the despatching of their wounded to the rear. A similar measure should find place in our arrangements, and the vehicles should rendezvous at the position assigned to the Clearing Hospital, where they would be immediately available for the purpose they are intended to serve. By this means the movement to and from the Clearing Hospitals could be at once initiated, and the Transport and Supply Authorities would be relieved from the necessity of attempting to carry out what might prove to be two incompatible functions.

(II.) So much for the functions of the Clearing Hospital during or immediately following a big engagement. Let us now try to consider its work in the intervals.

In order to make this more intelligible a diagram is attached showing the working of the Transport and Supply Services and the Medical Service behind the Divisions. The diagram is compiled from those in the Field Service Manuals of the respective Services. It is not put forward as a representation of the normal. We have lately been told in a series of lectures, given at the Royal Army Medical Corps College, that in war there is no normal. But the scheme illustrates the general principles of the work. As it contemplates a railhead several days' march from the fighting army, it does not err on the side of leniency. In modern days in a civilized country the railhead would probably be nearer, which would make the problem easier.

Starting, then, from the Advanced Depôt, we see the Transport and Supply Service pushing up its supplies through the various stages of the Transport and Supply Park to the Transport and Supply Column, whence they are distributed to the various units in front. There is also the return stream of empty vehicles from column to park, and through the various stages of the park to the Advanced Depôt. It is of these empty vehicles that the Medical Service is to take advantage for the return of the sick and wounded from the front to the Advanced Base. It looks simple enough, but it must not be forgotten that whenever possible the column and park replenish from local resources, and there is no regular backward flow to the Advanced Depôt. This introduces at once rather a serious complication from the medical point of view.

Now let us see what medical units we have at the Advanced


DIVISION
DIVISION
DIVISION
T. and S. Clm.
T. and S. Clm.
T. and S. Clm.
No 1 SECTION
Div. T. and S. Park
Rest Camp
No 2 SECTION
Div. T. and S. Park
Rest Camp
No 3 SECTION
Div. T. and S. Park
Rest Camp
F
E
ADVANCED DEPOT
C.H.
C.H.
C.H.
A.D.M.S.
S.H.
C.D.
10 Miles
Road Post
1 Stationary Hospital
20 Miles
Rail Head
Zone of Field Ambulance
Zone of Clearing Hospitals
Lines of Communication
½ Day's March
½ Day's March
½ Day's March
½ Day's March
1 Day's March
1 Day's March
3½ Days March
S.H. ..... Stationary Hospital
C.H. ..... Clearing Hospital
A.D.M.S. Advanced Depot Medical Stores
C.D. ..... Convalescent Depot
Medical
Transport
2 Stationary Hospitals
4 General Hospitals
1 Sanitary Section
1 Laboratory
1 Advanced Depot Medical Stores
1 Base Depot

Depôt. We find one Clearing Hospital for each Division, one Stationary Hospital (mark this), one Advanced Depôt of Medical Stores.

If the medical diagram is republished I hope we shall also see a Convalescent Depôt, a unit which has recently been added to War Establishments. I have ventured to add it to the diagram with this paper.

Now what is the function of the Clearing Hospital at this stage? Its function is to gain touch with the medical field units ahead, to keep them empty so as to maintain their mobility, and to pass their inmates back to the Advanced Base, and hand them over to the hospital there.

It is most important that the Clearing Hospital be sent up to the Advanced Base at once, as, though severe fighting may not begin immediately, there will probably be some casualties, sick will begin to come in the moment an army takes the field, and the stream will be a constant one. It is calculated that three per 1,000 will seek the Field Ambulances daily; spread over a Division that means, roughly, sixty men a day. Of these it will not be too much to estimate that one-tenth—*i.e.*, six—will require longer treatment than a Field Ambulance should be called upon to give them. They will not be fit to return to the ranks for an appreciable time, and should, therefore, be without delay cleared out of the fighting zone.

We have got forty men a week per Division to get rid of. How far they should be sent back is a matter for later consideration, and must depend on the nature of each case; but it is clear their place is not in the Field Ambulance, and they become material for the Clearing Hospital.

The latter is primarily a "clearing" organisation, and should only function as a hospital for so long as it is unable to hand its patients over to a stationary unit or pass them down the line of communication. Its ambition should be to remain empty as long as it can, with its material packed (on wheels if possible), so as to be ready to advance to the aid of its allied divisional units in front the moment the emergency arises. To enable it to perform this, its primary function, medical and other officers must grow accustomed to the sight of medical units empty and rolled up. It has hitherto been a reproach to a medical unit to be without patients, and the smallest excuse has been held sufficient to pitch and open out. For a Stationary Hospital this may be a laudable sentiment, always provided that the strain on the Supply Services

is not thereby increased unnecessarily; but for a unit which may be called upon to move with little warning it is a tactical fault of the first magnitude, and should be avoided by every possible means.

It should be a reproach to a Field Ambulance to be harbouring patients unlikely to be shortly fit to return to the ranks, and whom it is in a position to hand over to a Clearing Hospital. It should be a reproach to a Clearing Hospital to be retaining patients whom it can pass on to a Stationary Hospital, with perhaps one exception, which will be mentioned later.

It cannot be too strongly emphasised that, as is so clearly laid down in the Field Service Regulations: "The Medical Service in the field is based on the system of evacuating sick and wounded." But at the same time it is equally important to remember that the medical officer is the only one who can control wastage, and that his first and paramount duty, whilst getting rid of all non-effectives from the front, is to prevent any unnecessary leakage, and to keep the fighting line full.

Having succeeded in getting his unit to the head of the line of communication, the Officer Commanding the Clearing Hospital has work immediate to his hand. He should at once organise a convoy section from his *personnel*, and take the earliest opportunity of inspecting and familiarising himself with the country between the Advanced Base and the Field Ambulances which it is his business to clear. He should arrange for rest stations, if the journey is long enough to require them. These should coincide with the exchange stations of the Divisional Transport and Supply Parks, on whom he will be dependent for much of his transport.

He should take steps to divide and classify his baggage, that proportion necessary for immediate work being packed together always ready for a start. His *personnel* should be similarly organised into rest-camp and convoy parties; or a main advance party and a party to follow with the heavier impedimenta.

He should form an estimate of the amount of carriage required for normal and regular freeing of the Field Ambulances, and should arrange with the Deputy Director of Medical Services for the systematic working of the medical convoys, remembering that the Field Ambulances should never be allowed to send their vehicles more than a day's march to the rear, *i.e.*, as far as the head of the Supply Park, and usually should not send them further than the head of the Supply Column.

He should consort measures with the Officer in Command of

the Advanced Depôt of Medical Stores for the utilisation of the men of the medical convoy section in escorting medical stores forward to the Field Ambulances, and in handing them over.

He should without delay arrange for the study of the best methods of adapting local or other transport to medical needs, and should set about collecting the necessary material, and instructing his men in its use.

In arranging for rest camps, he should, in conjunction with the Administrative Medical Officer of the Division, consider the advisability of establishing a Convalescent Depôt in connection with the rest post nearest to the Division, for the temporary reception of men likely soon to be fit again, whom it may be desirable, perhaps for military reasons, such as an early advance, to clear out of the Field Ambulances, but whom it may not be necessary to send further down the line. This Convalescent Depôt might, under battle conditions, become the rallying point and refreshment station for the lightly wounded.

Though a mobile unit, a Clearing Hospital has no transport of its own, but transport will be furnished when required by the Inspector-General of Communications. The position is not ideal, more especially as the work of the Clearing Hospital is not really within the sphere of the line of communication, but is mainly in front of the Advanced Base; but given a complete understanding between the Officer Commanding Clearing Hospital and the Transport Authorities, the plan is workable.

To move the whole Clearing Hospital requires the equivalent of seventeen general supply wagons; essentials for a rapid advance might be carried on about five, if the others could be guaranteed to follow up quickly.

Urgent and constant supplies to the front, such as ammunition and rations, have special forwarding organisations in the ammunition and supply parks.

Clothing and other ordnance stores which are sent up intermittently are conveyed by transport obtained on requisition from the Army Service Corps. Medical stores, where there is no rail, are forwarded in the latter way.

As there is a frequent flow forward of medical supplies from the Advanced Depôt of medical stores to the field units, and a constant flow back of ineffectives to the Advanced Base, supervised by the Clearing Hospital, it is a question for consideration whether this unit should not have a small permanent transport cadre of its own. The need becomes the more pressing when the Supply Column and

Park replenish from local resources, and the regular backward service to the Advanced Base is interrupted. This transport could be used for carrying medical supplies forward, for moving the unit itself when required; and in the other direction for the regular routine evacuation of sick from the front, thereby freeing the Supply Park from the responsibility, an advantage which would not be unappreciated by the transport unit.

Under some circumstances it may be possible to give timely notice of an impending engagement, and for the Clearing Hospital to be pushed forward, and sit down to await eventualities; but this will not be the usual state of affairs. The General Officer Commanding in Chief is much more likely to delay calling up the Clearing Hospitals until the last moment, so that no inkling of his intentions may be disclosed prematurely. It is in these, the most urgent circumstances, that some pre-existing scheme of transport seems so very desirable. The Medical Officer in charge should not lose sight of the benefit of such an arrangement.

It is abundantly apparent how close the co-operation between the transport authorities and the Clearing Hospital must be if efficiency and smooth working are to be attained.

Nothing can be more conducive to such co-operation than a mutual knowledge of each other's needs and difficulties. Each must be anxious to help forward the general welfare, even at the expense, sometimes, of some sacrifice to the individual service.

A SIMPLE METHOD OF BLOOD CULTURE IN ENTERIC FEVER.

Preliminary Note.

By Major S. L. CUMMINS and Captain C. C. CUMMING.
Royal Army Medical Corps.

In the *Arbeiten a. d. kaiserlichen Gesundheitsamte* for February, 1910, appeared an interesting paper by E. Gildmeister on the cultivation of typhoid bacilli from the blood of patients, the medium used being sterile water. Dr. Gildmeister, believing that the added blood would afford sufficient proteid to enable the organisms to multiply in sterile water, carried out a successful series of experiments, for details of which the original article should be consulted.

By adding one part of blood to from eight to ten parts of sterile water, a dilution which appeared to eliminate the bactericidal action of the blood while it afforded sufficient proteid for culture purposes, he was able to grow out typhoid bacilli present in the blood, obtaining these in pure culture by "plating" from the mixture after incubation. He considered that the hæmolysis of blood cells by the water aided the growth of the bacilli by liberating antibactericidal substances, to which process he attributed much of the efficiency of ox-bile in blood culture work.

He considered his method superior to any in which ox-bile was used, in so far as it was more simple and more constant; ox-bile being, as he pointed out, subject to great variations in composition and difficult to sterilize.

At the request of Sir W. B. Leishman we carried out experiments as to the comparative efficiency of water-blood culture and some other methods in enteric fever, and arrived at conclusions which appear to justify a preliminary note on the subject.

Experiment I.—To a mixture of 0·5 cc. of normal blood with 4 cc. of sterile water (1 in 9), one "loop" of a 24-hours broth-culture of typhoid was added.

Result: Typhoid bacilli were recovered in large numbers after incubation for twenty-four hours. This experiment, several times repeated, seemed to prove that, if a sufficient number of typhoid bacilli were added, they were able to grow in normal blood diluted to one part in nine with sterile water.

Experiment II.—To compare the "water-blood" medium with MacConkey's bile-salt glucose peptone water.

A 24-hours broth-culture of *Bacillus typhosus* was diluted as follows:—

$\frac{1}{10}$, $\frac{1}{100}$, $\frac{1}{1000}$, $\frac{1}{10000}$, $\frac{1}{100000}$, and $\frac{1}{1000000}$.

0·2 cc. of each dilution was added to:—

(*a*) One part normal blood in 9 parts sterile water (1 in 10).

(*b*) One part normal blood in 9 parts "MacConkey" fluid (1 in 10).

Incubated for forty-eight hours at 37° C.

Result: Typhoid bacilli were recovered from all the blood-water tubes *except* those to which the $\frac{1}{100000}$ and the $\frac{1}{1000000}$ dilutions of typhoid broth had been added. These were sterile. Typhoid bacilli were recovered from *all* the "MacConkey" preparations.

Experiment III.—To compare the following media:—

(1)	Normal blood	1 part
	Sterile water	7 parts
(2)	Normal blood	1 part
	1 per cent. citrate of soda in normal saline	7 parts
(3)	Normal blood	1 part
	Glucose bile-salt peptone water	7 parts
(4)	Normal blood	1 part
	Bile-salt peptone water	7 parts
(5)	Normal blood	1 part
	Bile-salt water	7 parts

N.B.—The bile-salt was in all cases 0·5 per cent. of sodium taurocholate.

An emulsion of typhoid bacilli from an agar slope, made by shaking in "saline" and counting by Harrison's method, was standardised to contain 1,000 million bacilli per 1 cc. This was diluted one million times.

To 5 cc. (approximate) of each of the above media, 0·2 cc. of the diluted emulsion (or about 200 bacilli) was added. After incubation for twenty-four hours at 37° C., the media were examined by ddilution and plating, as well as by subculture.

Result:—

(1) Blood + sterile water: No typhoid bacilli recovered.

(2) Blood + citrate: No typhoid bacilli recovered.

(3) Blood + glucose bile-salt peptone water: Contaminations in large numbers. No typhoid bacilli isolated.

(4) Blood + bile-salt peptone water: Typhoid bacilli recovered, 171,500,000 per 1 cc.

(5) Blood + bile-salt water: Typhoid bacilli recovered, 110,500,000 per 1 cc.

This experiment seemed to indicate that the blood-water

medium destroyed *small numbers* of typhoid bacilli, thus preventing multiplication; that the glucose, favouring the growth of contaminations, to some extent counterbalanced the "exclusion" action of bile-salt; and that the proteid added with the blood to the solution of bile-salt in water made it practically as nutritive as a solution of bile-salt in peptone water.

Experiment IV.—To compare the following media:—

(1)	Normal blood..	1 part
	Sterile water	9 parts
(2)	Normal blood..	1 part
	0·5 per cent. sodium taurocholate in water ..	9 parts

An emulsion of typhoid bacilli in saline was standardised to contain 5,000,000,000 per 1 cc. and then diluted one million times.

0·4 cc. of the diluted emulsion was added to each of the above media (about 200 bacilli), about 5 cc. of the media being used in each case. After incubation for twenty-four hours at 37° C., the media were examined by subculture, by dilution and "plating."

Result:—

(*a*) Blood-water medium: No typhoid bacilli recovered.

(*b*) Blood-bile-salt-water medium: Typhoid bacilli recovered, 400 million per 1 cc.

Experiment V.—Four cases of enteric fever from the 10th to the 14th day of the disease were examined, to see whether the bile-salt-water medium would enable a diagnosis to be made from a small quantity of blood, 0.5 cc. being withdrawn from each case by finger-puncture and added to 4·5 cc. of bile-salt water.

After incubation for eighteen hours, typhoid bacilli in large numbers were recovered from the two most recent cases. The other two were negative, though subcultures were made on four subsequent days.

This result appears very striking in view of the small quantity of blood used, and the fact that the cases were in the second week of the disease.

Conclusions.—(1) That normal blood diluted from five to ten times in sterile water will serve as a culture medium for *Bacillus typhosus* when the bacilli are in sufficient number.

(2) That this medium is fatal to small numbers of typhoid bacilli owing probably to the bactericidal substances in the blood. This action would presumably be still greater in dealing with actual cases of enteric fever.

(3) That 0·5 per cent. taurocholate of soda in sterile water forms,

with the proteid of the added blood, a very efficient medium for blood culture in enteric fever.

On theoretical grounds this ought to be the case, as the bile-salt is known to inhibit contaminations, to favour the growth of organisms of the typhoid and colon groups, and to have some action in inhibiting the bactericidal substances in blood.

Further, as pointed out by Major Grattan, R.A.M.C., in the April number of the JOURNAL OF THE ROYAL ARMY MEDICAL CORPS, the taurocholate of soda is much more favourable to the growth of typhoid bacilli than the glycocholate, so the use of the former alone should be superior to ox-bile, which contains both.

The simplicity of the method should commend it for trial to those who are working at the subject of blood culture in enteric fever.

THE ALKALINITY OF THE BLOOD SERUM IN KALA-AZAR.

By Captain R. G. ARCHIBALD.
Royal Army Medical Corps.

The recent researches of Nierenstein[1] on the acidity and alkalinity of the blood in trypanosomiasis infections suggested the idea that a similar line of researches might be carried out in kala-azar, with the object of ascertaining if any change occurred in the blood serum of patients suffering from this disease.

Owing to the fact that kala-azar is still a somewhat uncommon disease in the Sudan, it was difficult to obtain sufficient material for an extensive number of tests, and although these results were obtained from only four undoubted cases of kala-azar, they are published in the hope that some specific line of treatment may be adopted in accordance with the changes that have been found to exist in the blood serum of patients suffering from this fatal disorder.

The tests were carried out in patients in whom the presence of the Leishman body had been previously demonstrated by the microscope.

The technique employed was that recommended by Moore and Wilson,[2] and the tests were carried out on the "entire serum" in preference to the whole blood, as Wright[3] has pointed out that from a clinical point of view the alkalinity of the serum is more important as it comes into such close contact with the tissues, and may be taken as an index of the changes taking place in the circulating blood. Formerly, litmus was usually employed as an indicator for estimating the akalinity of the blood, but Moore and Wilson found that sharper readings of the colour changes could be obtained by the use of dimethylamidoazobenzol, and accordingly this was employed in the tests.

Technique.—The blood was collected in Wright's glass capsules, samples being taken from the finger previously cleaned with methy-

[1] Nierenstein, M. (1908), "Observations on the Acidity and Alkalinity of the Blood in Trypanosome Infections," "Annals of Tropical Medicine and Parasitology," vol. ii., No. 3.

[2] Moore and Wilson (June, 1906), "Clinical Method of Hæmalkalimetry," *Biochemical Journal*, vol. i.

[3] Wright (1897), *Lancet*, vol. ii., p. 719.

lated ether and 5 per cent. formalin. The ends of the capsules were sealed in the ordinary way, the tubes left suspended for twenty-four hours, and then centrifuged so that the serum separated out free from the red cells. If the serum was stained as a result of hæmolysis, it was always discarded.

In each experiment a "control" was used, the blood serum being taken from three healthy persons, whose ages and racial characters corresponded as nearly as possible with those of the patient. In order to avoid the effects of an "alkaline tide," the blood from the patient and from the controls was always taken four hours after the last meal had been taken.

Normal sulphuric acid was employed as the standard acid for titration, and a series of dilutions of the normal acid were made, ranging from a twofold to a sevenfold dilution.

To every 100 cc. of these acid dilutions were added 8 drops of a 1 per cent. alcoholic solution of dimethylamidoazobenzol, a rich pink colour, sufficiently intense to show the necessary colour changes when mixed with serum, being thereby produced.

The same amount of indicator was always added to the acid dilutions, and when ready for use the mixture of acid and indicator was poured into a watch-glass.

Titration of Serum against the Standard Acid Solution.—The blood capsules after centrifuging were nicked with a file, and the end nearest the serum broken off. The sera of the control individuals was then "pooled" and placed in a separate glass capsule.

A fine capillary pipette, such as is used for estimating the Widal reactions, was inserted into the serum, and a column of serum allowed to run up to a mark made with a blue pencil, about 2 cm. up the tube. The pipette was then withdrawn, a small bubble of air sucked in, and the pipette inserted into the acid until the upper column of the acid was level with the blue mark. In this way equal volumes of serum and acid of a known strength were obtained.

The contents of the capillary tube were then blown out on a clean white slab, thoroughly mixed with the end of the pipette, and aspirated in and out of the capillary tube several times.

In doing this it was found advisable to avoid the presence of air bubbles in the mixture. If a yellow-coloured fluid resulted, a stronger acid was taken until an orange red was given, and the dilution of acid which last gave this yellow colour was taken as the index.

If, on the other hand, a pink or orange colour resulted from the

first titration, then a weaker acid was used till a yellow colour, free from red, was obtained, and the first dilution of acid which gave this yellow colour constituted the index. As far as possible, all the following estimations were carried out under similar conditions.

All glass tubes, pipettes, and flasks used throughout these experiments were subjected to immersion in pure hydrochloric acid for half an hour, washed in distilled water several times, and then dried in an oven at 130° C., in order to drive off any residual acid. This precaution was taken in order to avoid any fallacious results due to the presence of alkali in the glass. After this treatment, distilled water left in the tubes for twenty-four hours gave neither an acid nor an alkaline reaction.

Case 1.—An Egyptian soldier, aged 30, with a previous history of irregular fever of two months duration. The general condition of the patient was fair. Several blood examinations failed to show the presence of the parasite of kala-azar. The spleen was enlarged. Splenic puncture showed the presence of Leishman bodies. Soon after diagnosis, and before the patient was placed on any specific line of treatment, the reaction of the blood serum to "dimethyl" was tested, and the result was as follows :—

Pooled normal serum ..	0·033	expressed as a fraction of norma
Patient's serum	0·025	,, ,, ,,

This was, comparatively speaking, not a very advanced case, and the alkalinity of the blood of the patient, when compared with the pooled serum, will be seen to be diminished.

Case 2.—An Egyptian soldier, about 28 years of age, with a previous history of recurrent attacks of fever when stationed in the Blue Nile Province. Patient was admitted in a weak condition with a high fever and enlarged spleen. Examination of a peripheral blood film failed to show the presence of malarial or other parasites. The spleen extended to about an inch below the umbilicus, and the lower limit of the liver could be palpated below the costal margin. Splenic puncture showed Leishman bodies to be present.

The serum reaction was tested and showed a diminished alkalinity :—

Pooled normal serum ..	0·03	expressed as a fraction of normal
Patient's serum	0·024	,, ,, ,,

Case 3.—An Egyptian soldier, of about 30 years of age. He was admitted into hospital, with a previous history of fever, in the Kassala Province.

The general condition of the patient was fairly good. Both spleen and liver were enlarged, but the former was not sufficiently enlarged to justify splenic puncture. Repeated examinations of the peripheral blood having given negative results as regards the presence of the malarial parasite, the liver was punctured and a few Leishman bodies were found to be present. The alkalinity of the patient's serum was estimated two days after the diagnosis had been confirmed, and the results were as follows:—

Normal pooled serum ..	0·035	expressed as a fraction of normal
Patient's serum ..	0·023	,, ,, ,,

There was obviously a marked diminution in the alkalinity of the patient's serum.

Case 4.—A Sudanese boy, aged 14, a native of the Blue Nile Province, admitted to hospital suffering from epistaxis and diarrhœa. The previous history was very indefinite. On admission a history of epistaxis since childhood was obtained. Patient was somewhat thin and cachectic, and when lying in the prone position an abdominal swelling was apparent. This on palpation proved to be an enlarged spleen extending downwards 1 inch below the umbilicus. The liver was also enlarged. Examination of the peripheral blood was negative as regards the presence of malarial parasites, and splenic puncture was resorted to as an aid to diagnosis. Examination of the splenic smears revealed the presence of a large number of Leishman bodies.

The alkalinity of the patient's serum was tested soon after the diagnosis had been confirmed, and was as follows :—

Pooled normal serum ..	0·033	expressed as a fraction of normal
Patient's serum ..	0·020	,, ,, ,,

A blood count and an estimation of the hæmoglobin were undertaken in this case, and the figures were as follows :—

Red blood corpuscles	2,916,000
White blood corpuscles	4,680
Hæmoglobin	60 per cent.

A differential count showed :—

Polymorphonuclear leucocytes	43 per cent.
Large mononuclears	32 ,,
Lymphocytes	23 ,,
Transitionals	1 ,,
Eosinophiles	1 ,,

The patient was treated, soon after admission, with increasing doses of liquor arsenicalis for a period of one month, and during this period little change was noted in his general condition.

In view of the fact that a diminution in the alkalinity of the serum was found, and that such clinical signs and symptoms in kala-azar as epistaxis, ulceration of the buccal mucosa, petechiæ, &c., are common features in scurvy, Dr. Balfour suggested that an alkaline treatment might be efficacious.

Accordingly, calcium lactate in 30-grain daily doses was given, and in order at the same time to obtain, if possible, a direct lethal action on the parasite, orsudan in 1-gramme doses was administered intramuscularly four times a week.

The calcium lactate was given in increasing doses till the patient was taking 50 grains *per diem*. The spleen was found to be diminishing in size and the patient's general condition improving slightly. The diarrhœa and epistaxis ceased.

After three weeks' treatment the spleen had retracted to 1 inch above the umbilicus.

The patient's serum alkalinity was again tested and found as follows:—

Normal pooled serum ..	0·03	expressed as a fraction of normal
Patient's serum.. ..	0·026	,, ,, ,,

The alkalinity of the patient's serum had evidently increased after a month's treatment with large doses of calcium lactate, and the general condition of the patient had improved; but judging from the blood count and the hæmoglobin percentage, it was apparent that the prognosis was extremely bad. The count showed as follows:—

Red blood cells	2,666,000
White blood cells	3,125
Hæmoglobin	50 per cent.

Differential count showed:—

Polymorphonuclear leucocytes	32 per cent.
Large mononuclears	44 ,,
Lymphocytes	21 ,,
Transitionals	2 ,,
Eosinophiles	1 ,,

In addition to the calcium lactate, hæmatinics were also administered, but at the end of a fortnight the patient relapsed.

Two days previous to death the hæmoglobin percentage had fallen to 25 per cent.

The *post-mortem* appearances of the spleen and liver were typical of kala-azar, both organs being enlarged and the liver cirrhotic. Smears revealed numerous Leishman bodies. Ulcers were not present in the intestines. The mucosa of the small intestine was very anæmic and considerably atrophied, and

resembled the consistency of thin tissue-paper. This latter condition has been present as a constant pathological condition in almost all the *post mortems* of these kala-azar cases. With such an atrophic condition of the mucosa of the small intestine the physiological functions of this portion of the gut are practically in abeyance, and consequently the emaciation of the patient progresses steadily in spite of all efforts to combat it.

CONCLUSIONS.

It is evident that the alkalinity of the blood in these four cases of undoubted kala-azar was diminished, and it is worth remembering that Rogers, Leishman, Statham, and other observers found that the ideal culture media for successful cultivation of the Leishman body is an acid one.

If, then, the alkalinity of the blood serum in cases of kala-azar be diminished, it is conceivable that the blood and tissues present a more favourable medium for the Leishman parasite than is usually the case; and, in order to obviate this, it would not seem unreasonable, whatever specific line of treatment be adopted, that drugs should be administered which tend to increase the alkalinity of the blood.

Of the above cases, only one was subjected to an alkaline treatment by calcium lactate, and unfortunately the disease was so far advanced in this instance that the drug had scarcely a fair trial.

A specific drug for the successful treatment of Leishmaniosis has not yet been found. Quinine and various arsenical preparations have not given satisfactory results up to the present, and hence the record of these four cases points to the advisability of employing such remedies as would increase the alkalinity of the blood.

Further, the alkaline reaction obtained in testing the serum of kala-azar cases may be of service in assisting the diagnosis in early cases where splenic enlargement is not marked.

I am indebted to Colonel Mathias, D.S.O., Principal Medical Officer, Egyptian Army, for his kind permission to publish these results, and to the officers of his staff at the Khartoum Military Hospital, for their assistance.

United Services Medical Society.

RECORDS OF PULSE-RATES AFTER EXERCISES OF VARIOUS KINDS IN TRAINED AND UNTRAINED PEOPLE, ILLUSTRATED BY SPHYGMOGRAMS.

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These notes on pulse-rate after exercise are only contributory to a discussion, and exposition of facts on the part of others from which I hope to gain more information than I am able to impart. The subject is not merely of academic interest, but of great practical importance. I refrain from taking up time in particularising its practical application to military and civil surgeons and physicians, as I wish to confine myself now, as far as possible, to a record of observed facts. In a paper written in 1905 analysing the position of "attention," and dealing with the "irritable hearts of soldiers," I asked the question whether there should be such an increase of a recruit's pulse-rate at the end of his hour's gymnastic work as, for instance, from 96 to 144. I am now prepared to answer that question, at all events, for myself. Before passing on to the observations I have made, I wish to make some quotations from the latest text-book literature on the subject, an article by Clifford Allbutt in vol. vi. of his "System of Medicine," entitled, "Over-stress of the Heart":—

(*a*) "On the whole the (pulse) acceleration is much more moderate in trained persons, and passes off sooner."

(*b*) Professor Allbutt quotes some experiments made by Dr. James Kerr on boys and girls, some untrained, others carefully trained for games; and then he says:—

"These observations of Dr. Kerr corroborate the conclusion of others that 172 is the extreme limit of pulse acceleration in the normal mechanism, and that 160 is rarely attained. If the limit of 170-172 be crossed, we have to do with an altered mechanism; perhaps with some affection of the medulla; perhaps with a shift of the cardiac rhythmical centre, and the condition may be called tachycardia. But to call mere frequency of pulse, under this limit 'tachycardia,' is either mere pedantry or falsely to suggest some new concept."

Personally, I should say that it was mere pedantry to describe a pulse-rate over 172 after exercise as tachycardia, and, any way, the use of the term in this connection does not at all agree with the definition of tachycardia given by Allbutt in another part of the volume.

(*c*) He quotes "Stahelin, who concluded that immediately after exertion the pulse-rate should fall about three beats per 10 seconds; but the fall is more rapid in the first 30 seconds than afterwards."

(*d*) Professor Allbutt says: "I think, indeed, for men in fair condition a doubled rate is excessive."

In order to answer my question about the recruit's pulse, I thought it would be helpful to know what was the pulse acceleration after more or less severe exercise of various kinds in persons trained to those exercises; and I wish here to define the sense in which I use the word trained. I do not mean a man who has undergone what is usually implied by a course of training for some specific event, as a boat race, or a boxing match, and who has lived on an exclusive or modified dietary, and, in short, made a distinct departure from his ordinary mode of life; but I mean men living under their ordinary and natural conditions, who are undergoing physical exertion every day, often twice a day, and sometimes three times a day for weeks, months and years on end; and who, in addition to their actual performances, have to be constantly practising so as to maintain, at the highest level, their suppleness and muscular co-ordination. To find such I have gone to the ranks of professional gymnasts and dancers, and have taken them exactly as I found them during their work. We read of all care possible being taken to avoid nervousness in making observations of this kind. Why? And if you know why, how are you going to do it? If any nervousness is a factor in the pulse acceleration, it should be taken into account, and how are you going to apportion the amount of the acceleration to nervousness and that due to physical exertion, and what is the difference in the action on the heart? How is it proposed, for instance, to eliminate any supposed element of nervousness in a body of recruits on their introduction to a gymnastic course? Or of a competitor in a championship race?

The only way to avoid misleading statements and opinions is to deal with the subjects of observation as you find them, and take all the presumed factors as a whole. My procedure has been to count the pulse before the exercise, and at the earliest possible moment after its cessation, either immediately after or

within a minute, as circumstances permitted. I avoid any attempt to draw up averages from a number of observations, as such averages are most misleading, and I give the details of some individual observations, selecting those which I think may be of greater interest and utility for the purpose of our discussion I will relate, first, some observations on soldiers made at Aldershot in September, 1909, on teams training for the Duke of Connaught's Challenge Shield over an obstacle course, a distance of a little over a mile with eleven obstacles. I am only giving one man of a team, the first whose pulse I counted after the run; the other men on whom I made observations had time, of course, for the pulses to slow down.

A private in the Buffs team, who was doing the course for the first time, had pulse of 84 before starting and one at the rate of 180, counted for a quarter of a minute, when he finished. I counted three other men's pulses for a quarter of a minute, and recounted the first man's, which had dropped to a rate of 132. It was not practicable to make longer notes of these men.

A man of the Scottish Rifles team, who had been doing the course twice a day for a month, had a pulse of 76 on starting and of 148 on finishing, falling in a minute or two to 124.

In the next example I had an opportunity of seeing when the pulse reached its starting rate after the finish of the run.

A man of the Lincolns team, just beginning the course, started with a pulse of 72, but I do not know the rate on finishing, as I counted five others before his; and after that his was 104. In less than half an hour the team ran the course a second time, and this same man's rate was 88 on starting and 164 on finishing, falling in a very short time, while remaining standing, to 96.

The next instance is of a man at the Army Athletic Meeting at Aldershot in August, 1909.

Serjeant M., aged 24, of the Royal Irish Rifles, between seven and eight years' service, had a pulse-rate of 76 before running in the heat of the 100 yards race, which he won. Immediately after his pulse-rate for successive quarter minutes, with five seconds intervals was 180, 164, 148, 156, 124. He then had to go to get ready to compete in the long jump, and when he had finished that, about twenty minutes later, the rate was 136, which dropped to 120, and remained steady at that when he sat down. About two hours later his rate was steady at 100 when standing, and 92 when sitting. This was at 2 p.m. The same afternoon he ran in the final of the 100 yards, open to N.C.O.'s and men, and

won it; his pulse-rate immediately after the race was 172, but I was unable to keep him for longer observations. But I had another opportunity about one and a half hours later, after he had won the hurdle race, immediately after which his rate was 204.

I was unable to find out when the pulse resumed what may be called a normal quiet rate, but as he was going through the gymnastic course for instructor at the time, I had an opportunity of seeing him the following morning, when his pulse was steady at 60.

Now here was a man who had undergone training for those athletic feats, though whether combined with any dietary regimen I do not know, and it is unimportant, but it is a fair presumption to make that the greater part of time occupied in running the hurdle race his pulse was going steadily at the rate of about 200 per minute, and not only for a quarter minute as when I counted it immediately he stopped running.

I now pass to another line of life. A principal dancer at a pantomine had a pulse-rate of 80 when standing and sitting and 76 lying. Immediately after her dance of about two minutes the rate was 200; on sitting down it fell to 148; on lying down to 124; on again standing it was 104; sitting 92; lying 100. In about a quarter of an hour it was 88 standing and 82 sitting.

I repeated these observations a few days later. Before the dance the pulse-rate was, again, 80 standing, and immediately after the dance I kept her standing, and counted the pulse for quarter minutes, with five seconds interval, and the rate was 196, 164, 148, 132, 132, 120, 112, 108, 108, 108, 100, and steady at that, and remained so when she sat down; and on lying down the pulse fell to 84 after a short interval, and on again standing up was 100. Though a minute examination of the heart was not feasible, I was able to ascertain that the apex was beating in a well-defined area in its normal situation.

I show tracings of this lady's pulse before her dance; No. 1, with ordinary quiet respiration, and No. 2 showing respiratory effects; No. 3 after the dance, and No. 4 after a short interval, with respiratory effects. I shall be glad if some one will explain tracing No. 3, similar ones to which I give further on.

Next a troupe of four American step dancers, of whom I will only give two sets of observations. A man aged 32, had a pulse-rate of 88 before going on the stage, and on coming off the rate for the first quarter minute was 172, falling to 124 in two to three minutes; but during the performance this man also danced a solo,

which was done at a rapid rate, and one night he kindly left the stage immediately after it to enable me to count his pulse for half a minute; the rate for the first quarter minute was 200, and then after a few seconds interval 180. I made similar observations on one of the lady members of the troupe, whose pulse was 68 before going on the stage, immediately after a solo dance 188, falling quickly to 140, and when leaving the stage at the end of the performance 120, and about an hour and a half later 85.

Time will not permit of relating the observations on all the different performers, and I will now select cases which illustrate the time within which the pulse has quieted down after severe exertion, and while the people have been going about. I have been able to observe this by getting the performers on evenings when they have previously had a matinee performance.

In the case of what are known as whirlwind dancers, the man, at 9 o'clock before going on the stage, had a pulse-rate of 76, having performed at a matinee in the afternoon at 3.30 o'clock. Within a minute or two of leaving the stage the rate for the first quarter minute was 176, falling to 148 in a few seconds, and twenty minutes later it was steady at 104.

His lady partner in the performance at 9 o'clock in the evening had a rate of 84, having performed at a matinee at 3.30 o'clock. Immediately on leaving the stage her pulse-rate for the quarter minute was 216. This same lady on another evening had a rate of 80 before dancing, and immediately after one of 208, and half an hour later one of 108; and on another occasion she had a rate of 76 before dancing, of 212 after dancing, and half an hour later a rate of 108. Now, with the approximate constancy of pulse-rate before and after the performances it is fair to conclude that about the same frequency of pulse obtained during the matinee performances, and in about five hours the pulse-rates had resumed their normal under ordinary conditions of life. They may have resumed their normal rate sooner than that, but I can only speak definitely of the time at which I was able to make the observations.

Tracing No. 5 shows the lady's pulse before dancing, and Nos. 6, 7, 8, 9, after dancing, the tracings being taken successively. I may say I am only giving sections of the tracings, and not the whole lengths taken.

The next case is one which I was able to observe on two occasions with nearly a year's interval, during the whole of which period the lady had been at work. She is a well-known step-dancer and holds the reputation of being the Champion Sand

step-dancer, and is an expert of many years' standing. On the first occasion at 5 p.m., she had a pulse-rate of 76 while standing before dancing; she performed one dance only, and immediately after, her pulse-rate, counted for quarter minutes with five seconds intervals, was 156, 140, 120, 108, while standing; on sitting the rate was 112, 100, 96, 100, and after another minute and a half, 88. I saw her again the same evening at 11 p.m. when the rate was 76, and she had had dinner at 7 p.m., which as a rule she had at 3 o'clock. She performed three dances including a sand dance, and immediately after, the pulse-rate, counted in the same way as before was, while standing, 212, 160, 156, 132, 132, and on then sitting down, 120, 112, 112, 108, 104, 112, and remained steady at that for about five minutes when the observations ceased.

Nearly a year later I saw her again one day at 4.30 p.m. when her pulse-rate was 84 standing, and she had given a performance at 3 o'clock. On this occasion she danced a Scotch reel followed by a step dance, and immediately after, the pulse-rate was 146, 144, 144, 128, and on sitting 120, falling rapidly to 100. In this case the pulse quieted down to its normal level in about an hour, and the lady had to get from one theatre to another meantime. There was a marked agreement in the pulse conditions when observed on the two occasions with nearly a year's interval, and there is fair reason to suppose that very much the same conditions obtained constantly, so that for a period of years, daily and often more than once daily, the pulse-rate had not only been doubled but much more than doubled in rate, and that without any harm resulting.

I next take the case of a man, aged 38, who has been dancing since boyhood and has been specialising for the past thirteen years in what are known as Russian dances, in which a great deal of jumping and springing is brought into play. He may be seen at the present time at the Empire Theatre, though these observations were not made there, but at another theatre at which he was performing the same evenings as at the Empire. Before going on the stage his pulse rate was 68, and on leaving it, for quarter minutes with few seconds' intervals 164, 148, 148, 132, and in two to three minutes 104. During the performance of his troupe of dancers, this man danced a Russian solo, and on another occasion as he left the stage for a few moments I found his pulse rate for a quarter minute 180, and in less than half an hour after the performance it was steady at 96. I was unable to get longer observations as the troupe had to leave for the Empire. Here is a man who is a splendid specimen of activity, and who is

constantly practising, whose pulse is regularly much more than doubled in rate, which has probably been going on for some years. Tracing No. 10 was taken before the dancing; tracings Nos. 11, 12, 13, after the dancing.

I will now give a selection only of many observations made on a troupe of girls doing in their performance two dances with songs, and finishing with a skipping rope dance. The pulse was counted for successive quarter minutes until the rate became uniform for a whole minute. At the time the following observation was made the girls had been giving the same performance every night and on Saturdays twice a day for between four and five months. The pulse rate before going on the stage was 84 when standing. About a minute after the performance when sitting, the quarter minute rate was 184, 180, 132, 136, 128, 128, 120, 120, 116, when it remained uniform for a minute and a half and then counted for a whole minute, 109; four minutes later the rate was uniform at 104; a quarter of an hour later 104 when standing and 92 sitting. In most forms of exercise the exertion is intermittent, and the pulse undergoes periods of acceleration and relaxation, and to see what actually happened in such circumstances, I got this same girl a quarter of an hour after her stage performance when her pulse rate was uniform at 112, to do a few high kicks, immediately after which her pulse rate for the quarter minute was 160, falling in two minutes to 144, and a few minutes later to 108.

I have not always been able to find out what the pulse-rates have been later on after the performances, but I have some which show that the normal rate is resumed within an hour or two; for instance, one girl's pulse was 80 three-quarters of an hour after; another was 94; another was 76 an hour and a quarter afterwards; but further observations on that point are necessary. In showing some tracings of these ladies before and after their exertions, I take the opportunity of referring to a point connected with the respiration. There seems to be an idea among some that drawing voluntary deep breaths slows the pulse when quickened after exertion. I have not only not met such a case yet, but I have noticed that when the pulse is accelerated beyond a certain rate that the ordinary respiratory effects of alternate shortening and lengthening of the diastole are absent, which are present when deep breaths are drawn at a slower rate of the pulse. I am not prepared to say within 10 or 20 beats what the rate of pulse is below which such respiratory effects are noticeable, but I think that if the pulse-rate is much over 100 per minute the respiratory effects are absent.

When such respiratory effects are present they do not reduce the total pulse-rate. It must be remembered that these respiratory effects are more marked in some people than others.

In passing, I may say that I have tried to ascertain by taking successive tracings when and how the character of the tracings changes, but I cannot give any very satisfactory demonstrations; tracing No. 14 was taken immediately after a skipping-rope dance, No. 15 was the sixth successive tracing, and No. 16 was taken one and a half hours later. Tracing No. 17 was taken after a skipping-rope dance, with a pulse-rate of 116, and while voluntary deep breaths were being drawn; No. 18 was taken about an hour later, when the pulse-rate was 82, and the respiratory effects became marked. Tracing No. 19 was taken a short time after the dance, when the pulse-rate was 100; and No. 20 about an hour later, with the pulse-rate at 76, and the difference in the respiratory effects marked.

Lastly, the statement that the pulse acceleration is much more moderate and passes off sooner in trained than in untrained persons requires much qualification; and first of all the two classes are hardly comparable, because a man unused to any particular form of exercise cannot perform the work done by a man accustomed to it. I have not made so many observations on persons doing unaccustomed exercises, but those I have made do not in the least bear out the book statement quoted. The method I adopted was to get people to do, or attempt to do, something to which they were more or less unaccustomed. Now running upstairs is a trying form of exercise, and I got a porter, aged 42, an ex-soldier, to run up from the basement to the top of the theatre and down; his pulse on starting was 78 standing, and directly after the exercise in successive quarter minutes it was 112, 88, 72, 72, 76, 76, 72; he then sat down, and the rate was 79 counted for a full minute; and on standing again 87.

I got a stage hand, aged 37, to perform the unaccustomed exercise of simply jumping about the stage, in fact, to do as well as he could what is known in gymnastic language as "knees up." Though he had not much idea of "knees up" he made the attempt. He started with a pulse-rate standing and sitting of 66, and afterwards for successive quarter minutes the rate was 156, 124, 116, 88, 76, 72, 72, 72, 64, 60; he then sat down, and it was 66 counted a full minute, and on standing up again 79; one and a half hours later, after his dinner and when he had been bustling about, as he said, it was 106.

I experimented on the pathologist to my hospital, a man aged 42, who had practised no form of exercise the past few years. He skipped as hard as he could for one minute; before starting his pulse-rate was 77; afterwards in successive quarter minutes the rate was 172, 144, 128, 128, 132, 108, 104, 104, 92, 92, 84, 96, 84, 92, 92, 92, 92, 92, 88, 88, 84, 88, remaining steady at that; then on sitting, the pulse counted for a full minute was 87; a minute or two later it was 84.

I also got one of the hospital residents, aged 30, and a man unaccustomed to exercise, to skip as well as he could for about one and a half minutes. Before starting his pulse-rate was 84, when he had just left the operating theatre; afterwards the rate for successive quarter minutes was 176, 148, 144, 144, 144, 132, 132, 128, 132, 128, 124, 120, 124, 108, 120, 116, 120, and remained at that; quarter of an hour later it was 108; one and a half hours later 91; at midnight, *i.e.*, about six hours later, 72; and the next morning at 8.30 o'clock it was 71.

In order to make a more exact comparison I got a trained and untrained person to do the same thing, to run up and down 142 steps. A, trained, started with a pulse rate of 63; on reaching the bottom of the steps the rate was 116, nearly doubled; the rate fell 20 beats in the first fifteen seconds; between that point and the end of five minutes it fell 21 beats to an uniform rate of 75; and at the end of an hour it was 75 standing and 71 sitting.

B, untrained, started with a rate of 83; after the exercise it was 160, nearly doubled; it fell 20 beats in the first fifteen seconds; between that point and the end of five minutes it fell 28 beats to 112, fell another 16 beats in the next five minutes, and at the end of half an hour was 103 standing and 91 sitting, so that in half an hour the trained and untrained pulses were both within 8 beats of their starting points.

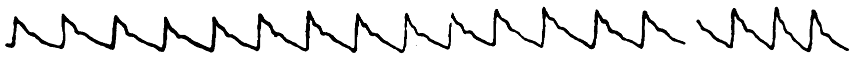
It would probably not be helpful now to multiply these examples, especially as there are others to follow me; so I will briefly summarise my observations.

There seems to be nothing obvious in the rapidity of a man's pulse-rate after exercise to account in any way for the irritable heart of soldiers.

In people trained for a particular athletic event, and in people accustomed to perform regularly certain forms of exercises, the pulse-rate is usually doubled, frequently much more than doubled, and sometimes trebled within 40 or 50 beats.

A rate of 170 and over is quite usual immediately after exercise,

PULSE TRACINGS.

1. 

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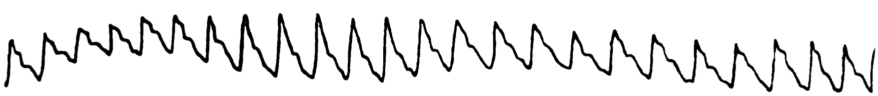
4. 

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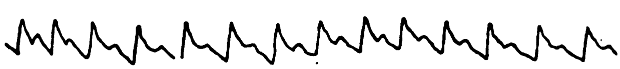
8. 

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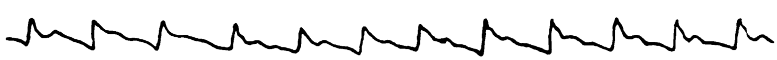
10. 

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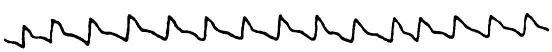
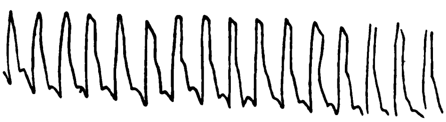
13. 

14. 

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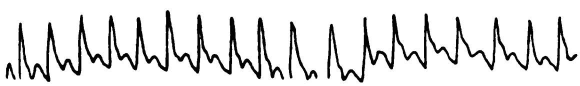
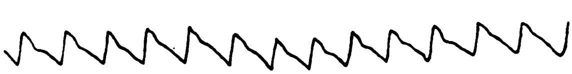
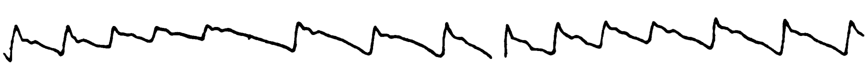
17. 

18. 

19. 

20. 

and so far from a rate of 160 being rare I have rarely found one under.

The exact time within half an hour or so that the pulse resumes the rate prior to the exercise I cannot definitely say, but I can say from the examples given in these notes that it does so within two or three hours; and no rule can be laid down that the pulse should be at any particular rate after exercise within any time measured by minutes or even half hours—I would go further and say that the criterion is the rate on the following morning. I do not know what the statement that the pulse decreases 3 beats every ten seconds means. If it means that as a rule the pulse decreases at that rate till the normal is resumed, then the statement is absolutely and entirely wrong. To refer again to two examples which are illustrative of what I have frequently found to occur; in consecutive fifteen seconds the rate decreased 32, 16, 16; then no decrease; 12, 8, 4; then no decrease; and then 4, remaining at that rate.

Again, a rate in periods of fifteen seconds decreased 24, 4, 16; no decrease for thirty seconds, 8, and then with periods of fifteen or thirty seconds with no decrease, it fell with a decrease of 4 to 8 beats.

When a pulse reaches a rate of about 100 to 112 the rate of decrease takes place by a fall of a few beats per minute, though I have found that it will remain at about 100 to 112 for half an hour or so.

Allowing for the incomparability of an exercise performed by a man accustomed and one unaccustomed to it, there is practically no difference in the behavour of the pulse-rate, except perhaps the pulse of the man unaccustomed to it may not be so rapid and may settle down more quickly.

DISCUSSION.

Dr. MACKENZIE said: I recognise the importance of Colonel Deane's observations, for as yet we have no reliable standard by which to measure the heart's efficiency. Many observers have sought to find a standard of inefficiency in a certain acceleration of the heart's rate after exertion, but the results given to-night show that the inferences drawn from the rapid heart action after exercise are not nearly so simple as had been thought. It cannot be too strongly insisted upon that what are often looked upon as abnormalities, such as increased rate, diminished rate, irregularity, murmurs, are not necessarily signs of disease. Moreover, one of the most common forms of irregular action of the heart is not only not

a sign of heart disease, but its presence is probably an evidence that the heart is free from disease. I refer to that form of irregularity which I have called the "youthful form," or "sinus irregularity," where there is a constant variation in the duration of the diastolic period, usually due to, and associated with, the movements of respiration. This arrhythmia is caused by a varying action of the vagus nerve—the respiratory act stimulating this nerve. If there is an abnormal excitation of the heart muscle, as by fever or by some poison, such as occurs in rheumatic fever, then the vagus effect cannot be produced. In doubtful cases after a febrile illness, if this irregularity should appear, I have taken it as an evidence that the heart muscle has escaped. I call your attention to this matter as I find it of considerable importance in prognosis, and as yet my observations have been too few to enable me to speak with absolute certainty, and more extended observations are needed to enable us to decide whether this view is fundamentally sound.

In many healthy people, when the heart slows down after some violent exertion, it will be found to become irregular. The most common form of irregular action is this sinus irregularity of which I have just been speaking. Extra systoles, too, are not infrequent, and appear sometimes in perfectly healthy hearts. They are, however, very frequent in cases where the muscle wall is impaired, as in old rheumatic hearts, and in sclerotic and senile hearts. If the patient has been under such a drug as digitalis, partial heart block may occur, and pauses in the pulse may occur from the heart-block.

Lieutenant-Colonel MELVILLE said he had followed the paper with much interest, but at the same time he felt that his knowledge had not been much advanced by it as regards the cardiac condition of the soldier. The work done by the various dancers, &c., on whom Colonel Deane had made his observations, was of quite an abnormal nature, very severe, and lasting for a short time only. It did not seem to throw any valuable light on what occurred in a man doing comparatively slow but prolonged work, as in the case of the soldier on the march, or even during an attack. As far as his own experience went he was inclined to disagree diametrically with Colonel Deane, and he thought that careful training should lead to more rapid return of the heart to the normal rate.

Captain DUNBAR WALKER said that during a course of physical training, such as all recruits attend, which he was then going through at Chelsea Barracks, from personal observation of his own pulse, he had come to the conclusion that as the training proceeded there did appear to be a tendency for the pulse to return to its normal rate quicker. At the commencement of the training it usually took about four minutes to return to the normal rate. Now, after some thirteen attendances at the gymnasium, it took two minutes, and on some occasions no alteration in the rate between starting and finishing was observed.

Dr. PEMBREY remarked that such observations upon the pulse were

much needed, for the physician under the ordinary conditions of practice, dealt with sick, not with healthy men, and for this reason was liable to form wrong conclusions. The effect of exercise upon the pulse of healthy men was so great that within a minute its rate could be doubled; the means whereby this response was brought about were not well understood; there appeared to be two factors, a nervous and a chemical; the former enabled a man to respond rapidly, the latter acted more slowly, owing to its origin from the products of muscular activity, and maintained the adjustment of the work of the heart. The best test for the condition of the heart appeared to be the rate of recovery of the beat after short, vigorous exercise. Well-trained men showed a reduction in the rate, even within the first ten seconds of the cessation of the exercise.

Lieutenant-Colonel Deane, in replying, thanked the members for their kind reception of his notes, and said he had not yet met a case (of the pulse settling down irregularly) such as that referred to by Dr. Moir, perhaps because his subjects were not young enough. The only irregularity, if such it can be called, was in the case of a man who presented extra systoles, which he had equally before the exercise, and about which the profession have learnt so much from Dr. James Mackenzie. He expected the criticism that those observations did not bear on soldiers' work, but they were carried out more with reference to the work in the gymnasium, and they had a distinct bearing in showing that there was no evil import in a recruit's pulse going up to 140 or over.

As regarded pulse counting, a stop watch was unnecessary, and a possible error of one or two beats in fifteen seconds was quite unimportant, and the same margin of error would occur with a stop watch with different observers. Dr. Pembrey had found the pulse of untrained people take longer to settle down after exercise, and of course his observations could not allow of exception being taken to them; equally the observations to the contrary related in the paper could not be taken exception to, and it showed that before any authority wrote in text-books on such a subject, it was important for him to make very much more extended observations than was often the case. For instance, to teach students that the normal mechanism of a heart did not allow of a pulse-rate over 170 after exercise was misleading. Dr. Pembrey supposed these performers had their chests constricted, an entirely erroneous supposition, because Colonel Deane knew, and could demonstrate that it was not so.

Clinical and other Notes.

NOTES ON A FATAL CASE OF ACTINOMYCOSIS OF THE LIVER.

By Lieutenant-Colonel J. B. WILSON and Captain J. COWAN.
Royal Army Medical Corps.

Quartermaster-Serjeant P. was admitted to the Royal Herbert Hospital, Woolwich, on December 10th, 1909. He complained of frequent cough. He had been in indifferent health since the previous August, losing weight, and sometimes sweating at night. No tubercle bacilli were found in the sputum.

On examination he had an indefinite tumour along the line of the ascending colon. There was œdema, with some bulging of the lower intercostal spaces. There was not much tenderness, and no rigidity of the right abdominal wall. Rectal examination was negative.

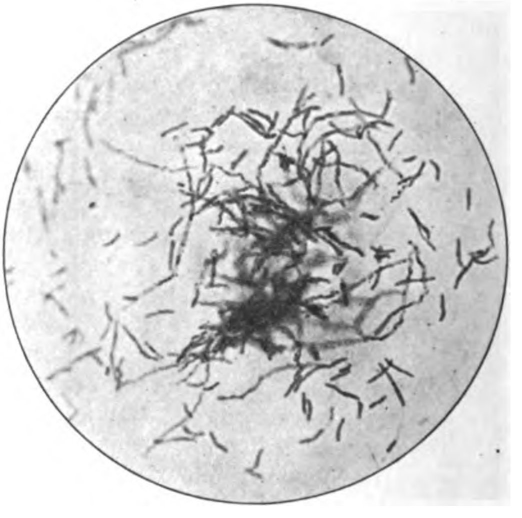
The diagnosis was considered to lie between an abscess in the liver and one in the right side of the abdomen, not involving the general peritoneum, but possibly connected with the appendix, and certainly shut off by adhesions from the general cavity. The blood count showed a marked polynuclear leucocytosis. The man had never served abroad, and had no history of malaria or dysentery.

On December 14th, 1909, under chloroform anæsthesia, the liver was aspirated in several directions without result. An incision in the flank was then made over the most œdematous point, down to the peritoneum; no pus was found. The appendix region was then explored and pus found, but no sign of the appendix was seen. There were very extensive adhesions. Through drainage, by a large drainage tube, was established from the appendix incision to the one in the loin. The man was much collapsed, and saline transfusion was performed during the later stages of the abdominal operation.

On December 21st, 1909, it was noticed that not much pus was draining from the wound. The œdema over the lower ribs had increased. A Pravaz syringe, plunged into the liver above the eighth rib, in the posterior axillary line, withdrew thick yellow pus. On examination this material was found to consist, largely, of masses of felted branching mycelium.

Next day the patient was anæsthetised; 1½ inches of the eighth rib were rapidly removed subperiosteally. After packing off the plural cavity (as there were no adhesions) drainage was established from the abscess by a large tube. Very little pus escaped; what did come, however, showed the "sulphur granule" appearance in a marked degree, The man, however, did not improve, but gradually sank, and died at 7.20 a.m. on December 26th, 1909.

Post-mortem Notes by Captain Cowan, Thirty-six Hours after Death.—Chest: The right pleura contained a large amount of clear greenish fluid. There was one adhesion at the apex of the right lung (patch of old pleurisy over tuberculous deposit). Firm adhesions existed between base of lung and diaphragm. No pus was found. The left pleural sac was obliterated by recent adhesions. Right lung: There was congestion of lower lobe, and a scar of old tuberculous deposit at the apex; the left lung was congested. The pericardium contained a fair amount of fluid; no pericarditis was present. The heart weighed 12½ ounces; the left ventricle was hypertrophied, and the right dilated. There was no valvular disease. The abdomen contained a large amount of



intraperitoneal fluid; coils of intestine were matted together by adhesions, especially in the right hypochondriac and in both iliac regions. There was pus in front of the cæcum and ascending colon, but it was everywhere shut off by adhesions. The great omentum was almost free from peritonitis. The spleen weighed 8 ounces and appeared healthy. The right kidney weighed 6½ ounces, and the left 8 ounces. The liver weighed 84 ounces; the right lobe was firmly adherent to parietal peritoneum. Occupying about half the substance of the right lobe was a large abscess, apparently the result of the coalescence of a large number of small necrobic areas. The abscess cavity was completely filled with necrosed liver substance and thick viscid pus. The sulphur granule colonies of actinomyces were plainly seen when the pus was spread on a slide. The stomach was dilated, and the mucous membrane atrophied. The mucous membrane of the duodenum was much congested; there were no ulcers; the remainder of

the small intestine was apparently healthy. There was a good deal of peritonitis in the neighbourhood of the cæcum. The vermiform appendix was bound down by adhesions behind the abscess cavity, which had been drained, but it was quite normal. The lumen was shut off from the cæcum and contained clear mucus. The mucous membrane of the cæcum and large intestine was congested; there was no ulceration. The pancreas was firmly adherent to the duodenum; there was no abscess or other lesion.

Note on the Microscopical Appearance of the Mycelium.—The pus was thick and viscid and difficult to spread in a thin smear. Stained by Gram's method, but not counter-stained, it showed :—

(1) Large densely stained masses of irregular outline. The thinner parts showed the mass to consist of a feltwork of mycelium threads, the majority showing degeneration into chain spores.

(2) Smaller masses, some of which had the typical radial arrangement. Many of the threads were spirillar. Branching was well shown.

(3) Large numbers of short threads resembling bacilli. No typical club-shaped forms were seen. The streptothrix was not acid-fast, and the only satisfactory method of staining was with gentian-violet.

Aerobic and anaerobic cultures were made on glycerine-agar. Shake cultures on glucose agar were also made. None of these were successful.

Remarks.—This case is reported as the condition is a rare one. In the Service one sees so much of the "tropical" variety of liver abscess that one is rather apt to overlook the fact that of course there are numerous causes of abscess of the liver, which may occur in people who have never left England; but of these causes, actinomycosis is certainly one of the rarest.

A NOTE ON THE STERILISATION OF "ALL-GLASS" HYPODERMIC SYRINGES.

By Major W. S. HARRISON, and Lieutenant H. S. RANKEN.
Royal Army Medical Corps.

The method of sterilising hypodermic syringes chiefly employed in the Army is that which was originally recommended by Sir A. E. Wright—by drawing into the syringe oil heated to temperature of 160° C., or thereabouts. This method has the disadvantage of being dirty, but otherwise, when used with the Roux pattern syringe, has proved satisfactory, and experiments carried out by one of us showed that the method was reliable for that pattern of syringe. But a series of contaminations with blood cultures, made after withdrawing blood with an "all-glass" syringe, "sterilised" by hot oil, drew our attention to the possibility that, for this pattern syringe, this method of sterilisation was not reliable. It was determined, therefore, to put the matter to the test of experiment with the following results.

Experiment I.—An "all-glass" 5 cc. syringe was contaminated by filling with a mixture of broth cultures of *Bacillus mesentericus* and *Staphylococcus aureus*. It was filled three times with oil at 160° C., and then with sterile broth which was blown out into a sterile tube and incubated for twenty-four hours. The result was that, in every instance, there was a growth of both *B. mesentericus* and *S. aureus*.

Experiment II.—The same syringe was taken to pieces after being contaminated as in the first experiment, and all the parts were soaked in oil at 160° C. for three minutes. It was then put together, and when cool enough to handle was filled with broth which was ejected into a sterile tube. On incubation there was no growth.

Experiment III.—The syringe was sterilised as above, and the piston rod contaminated midway down its length with a loopful of the mixed culture of *B. mesentericus* and *S. aureus*. It was then filled three times with oil at 160° C., and washed out with broth which was incubated for twenty-four hours. The result was a "growth" of both the organisms.

These experiments show definitely that hot oil at 160° C. cannot be relied on to sterilise "all-glass" syringes, unless the syringe is dismounted, and all the parts soaked—a method which is obviously unpractical, as it takes a long time to cool the syringe, and the chances of fresh contamination during the process of putting together are very great; moreover, it leaves the syringe covered with oil and dirty to handle. Experiment III. shows that germs which have been deposited on the piston rod of an "all-glass" syringe are carried down into the chamber of the syringe, and, further, that such contaminations are not removed by refilling the syringe with hot oil. It is to be noted that the piston rod may very easily be contaminated by being touched by the fingers when it is withdrawn.

It remained, therefore, to find a method which was more reliable, and at the same time as convenient as the hot oil method. It was determined to try the effect of boiling solutions of carbolic acid.

Experiment IV.—A 5 cc. "all-glass" syringe was contaminated by washing out with the mixed broth culture, and filled three times with boiling 1 in 20 carbolic lotion. It was then washed out with broth and incubated as before. The result was that in every case the syringe was found to have been sterilised. The question arose as to whether the amount of carbolic acid left in the syringe was sufficient to inhibit the growth of organisms, so the tubes of broth which had been in the syringe, and which were apparently sterile after incubation for periods varying from one to five days, were inoculated with the mixed culture, and they gave an abundant growth of both organisms in twenty-four hours, showing that the quantity of carbolic acid present was not sufficient to prevent growth.

Experiment V. was a repetition of No. IV., substituting 1 in 40 carbolic lotion. It was found that, although, as a rule, boiling 1 in 40

carbolic was sufficient to sterilise the syringe, occasionally some organisms escaped. Thus a 1 in 40 boiling carbolic lotion cannot be relied on to sterilise the syringe when used as described.

Experiment VI.—The piston of a sterile syringe was contaminated in the middle of its shaft with a loopful of the mixed culture, the syringe was then treated as before with boiling 1 in 20 carbolic lotion. Broth which was drawn into the syringe and afterwards incubated remained sterile.

Experiment VII.—The above experiments with 1 in 20 carbolic lotion were repeated, using lotion which had been boiling freely for fifteen minutes. It was found that the solution retained its sterilising properties perfectly. This shows that the method is reliable when a large number of injections have to be given at the same time, and the carbolic lotion is kept boiling during the operations.

Experiment VIII.—A syringe previously treated with oil was contaminated, and then filled three times with boiling 1 in 20 carbolic lotion. It was found that, under these circumstances, the carbolic lotion failed to sterilise the syringe, but, when the syringe was freed from oil by washing with ether, and the experiment repeated, sterilisation was perfect in every case.

Conclusions.—(1) A contaminated "all-glass" syringe cannot be sterilised by filling it three times with oil at 160° C.

(2) It can be sterilised with certainty by filling three times with boiling 1 in 20 carbolic lotion, but not invariably when 1 in 40 carbolic lotion is used.

(3) The amount of carbolic acid left in the syringe when diluted with a syringeful of fluid is not sufficient to inhibit growth of the organisms tested, and, in any case, the carbolic acid can easily be removed by washing out the syringe with sterile water or saline solution.

(4) A 1 in 20 carbolic solution retains its disinfecting properties after boiling for fifteen minutes.

(5) The sterilising of an "all-glass" syringe by boiling solutions of carbolic acid is interfered with by the presence of oil in the syringe, as might happen when the syringe had been previously treated with oil in the hope of disinfecting it, or when it had been used for injection of mercurial cream.

The only drawback to the use of carbolic lotion is that the needles of the syringe are apt to lose their polish; this can be avoided by keeping them in alcohol or methylated spirit.

NOTES ON A CASE OF OCCLUSION OF THE BASILAR ARTERY.

By Captain J. COWAN.

Royal Army Medical Corps.

Corporal S., R.F.A., was admitted to the Royal Herbert Hospital on the evening of January 1st, 1910, in a helpless condition, with grave cerebral symptoms.

The patient was a well-developed, muscular man, weighing 13 st.; age 27; service thirteen years; single; teetotaler; no history of syphilis or any other serious illness.

History of Present Illness.—He was spending a furlough, prior to leaving for India, with a married sister near Woolwich. Had been in good health, but had complained of constipation for a couple of days before the onset of attack. He retired to bed early on December 31st, owing to a bilious attack, and he vomited once that evening. Early on the morning of January 1st he aroused the household by knocking on his bedroom wall, and he was then found to be in a "fit." He was seen by Dr. Ferguson, of Eltham, who had him removed to hospital later in the day, and very kindly sent notes of the case.

On admission to hospital he was in a semi-conscious condition, with some delirium and signs of cerebral irritation. (Earlier in the day he had been wildly delirious.)

During the night, January 1st to 2nd, urine and fæces were passed involuntarily. On January 2nd he was still semi-conscious, there was marked rigidity of all four limbs, and some signs of bulbar paralysis. He slowly opened his eyes when asked to do so, but apparently he was unable to open his mouth, articulate, or swallow.

Temperature 100° F., pulse 100, respirations 28. Breathing was stertorous owing to the tongue falling back through paralysis of tongue muscles. This was relieved easily by propping the head well forward. There was no distress in breathing, and the lungs and heart appeared to be normal. There was no retraction of the head, and no opisthotonos. The face and neck were congested; pupils equal, neither dilated nor contracted, did not appear to respond to light; no nystagmus. There was a slight difference in the two sides of face—the right side appeared rather fuller and less wrinkled than left, but there was no distinct facial palsy. All four limbs were extended, markedly rigid, with clonic spasms. The patellar and supinator reflexes were much exaggerated on both sides. Ankle-clonus slight on left, indefinite on right side. Both plantar extensor reflexes very marked, extreme on left side, and produced by touching the limb anywhere. The signs generally on the left side were slightly more marked than on the right. Catheter passed—urine alkaline, no albumin.

On January 3rd the patient was completely unconscious, the rigidity had passed off, and there was complete paralysis; pupils equal and contracted, no response to stimuli. Deep reflexes remained the same. Tem-

perature rising (103·6° at 10 a.m.). Catheter passed—about one pint of dark urine drawn off—albumin present in moderate amount. Nutrient enemata were given four hourly. It was considered advisable to obtain a sample of cerebro-spinal fluid on account of the early meningeal symptoms. Lumbar puncture was performed by Lieutenant-Colonel Wilson, and after several punctures in the lumbar region without result, about 4 or 5 cc. of fluid were removed from the lower dorsal region. The fluid escaped slowly in drops and showed slight greyish turbidity. After centrifugalization, smears showed a few red cells and a few leucocytes, chiefly unicellular; no micro-organisms.

The patient died early on the morning of January 4th. His temperature, which had been steadily rising since the 2nd, was 110·6° F. before death.

Post-mortem Examination.—Thirty-one hours after death. Deep discoloration in dependent parts. No signs of injury.

Thorax.—Right pleura: recent adhesions in upper half of chest; no fluid. Left pleura: no adhesions, no fluid. Both lungs congested, otherwise apparently normal. Pericardium: healthy; normal amount of fluid. Heart: 12 ounces; fatty deposit at apex; no valvular disease. Aorta: atheromatous patches in first part of aorta, but the aortic valve was free from disease.

Abdomen.—Liver 54 ounces; congested, otherwise apparently normal; gall-bladder distended with bark bile. Spleen: 6½ ounces; congested and friable. Kidneys: right 7 ounces, left (with some fat) 12 ounces; both deeply congested (cloudy swelling). Peritoneum: healthy. Stomach: small and large intestine, and other abdominal viscera apparently healthy.

Brain.—Engorgement of meningeal blood-vessels; pia mater firmly adherent to brain along both sides of longtitudinal fissure; recent inflammatory lymph over frontal lobes; cerebro-spinal fluid scanty. Base of brain: no meningitis; the basilar artery was completely blocked by a whitish plug at its bifurcation and there was a clot about 1 inch long behind it. The cerebral arteries appeared to be normal. The pons was undergoing softening; no hæmorrhages were found beyond punctiform hæmorrhage in the grey matter; the white matter in both hemispheres was perhaps somewhat blanched, but no infarcts were seen.

Remarks.—Embolism or thrombosis of the basilar artery appears to be a very rare occurrence, and I should think that the condition is seldom recognised *ante mortem*.

In this case a tentative diagnosis of hæmorrhage into the pons with cerebral meningitis was made.

Professor Osler, in a short account of occlusion of the basilar artery, remarks that the symptoms resemble those of hæmorrhage into the pons.

The association of atheroma of aorta is interesting, and no doubt the thrombus came from a patch of atheroma; but this pathological condition produced no symptoms and could not have been diagnosed.

A SURGICAL WEEK-END IN THE SIERRA LEONE PROTECTORATE.

By Major F. J. W. PORTER, D.S.O.
Royal Army Medical Corps.

On August 12th I received a wire from Dr. Jackson-Moore, W.A.M.S., asking me to spend a couple of days with him at Moyamba. This is the headquarters of a district, and is 76 miles north-east of Freetown.

I left at 7 a.m. on the 14th, and reached my destination at 1 p.m. Travelling at a higher speed on this line is not possible owing to the narrow gauge, sharp curves, and utter disregard of keeping or making up time, which is exhibited by the Sierra Leone creole.

After lunch we went to the hospital. It is a very small wood and iron building and very roughly put together. A number of cases had been collected for operation, chiefly scrotal elephantiasis and inguinal hernia; in several, both conditions were present.

Many of the men were under 30 years of age, and had been carrying scrotal swelling ranging from 20 lb. to 50 lb. for several years. The penis was completely buried, and (what is to the African native a tremendous drawback) quite useless for the purpose intended by Nature.

The operating table consisted of a wide deal table covered with tin, and perforated by a couple of holes for drainage. Originally it had been intended for *post mortems*.

The anæsthetist, dresser, and nursing staff were combined in the person of a Sierra Leone creole dispenser, very willing, but not possessing a very deep knowledge of the art of giving anæsthesia. Frequent pauses were necessary, either to rescue the patient from an over-dose of chloroform or to get him more deeply under. His instructions, Mr. — give him another pennerth (sometimes two pennerth), answered the purpose fairly well—and with a couple of men to hold on to the feet and wrists, we got on as well as could be expected.

On Saturday afternoon, two elephantiasis cases were operated on.

The usual procedure in these cases is as follows:—

After the application of a rubber tourniquet to the root of the tumour, a deep incision is made about 2 inches to one side of the middle line, commencing about 2 inches from the tourniquet and extending downwards for a distance varying with the size of the tumour. The tunica vaginalis is opened and exit is usually given to a large quantity of fluid. The gubernaculum is divided, and the testis in its tunic drawn out. The latter is invariably much thickened, and it is freely removed. The testicle is dropped back into the cavity for protection. A similar procedure is adopted on the other side. A median incision is made at about the same level as the first two, and the penis dissected out. A curved skin incision is then made from about the centres of the first

two, and drawn round the back of the tumour, the skin dissected towards the perineum and the mass removed.

The penis is covered in by flaps taken from those which were first cut. Thinking it possible to improve on this method, we devised the following :—

The skin immediately round the preputial orifice is usually quite thin and easily detached. It is, therefore, very suitable for covering the penis after it has been dissected out. It also seemed much easier to fashion the new scrotum before the tumour had become collapsed from evacuation of the hydroceles. A superficial incision was made in the middle line from 2 to 3, fig. 1. From 3, a racquet-shaped incision (also superficial and shaped as in diagram) was made, about 1½ inches all round from 1, which represents the preputial orifice.

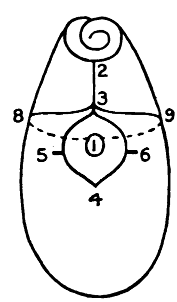


FIG. 1.

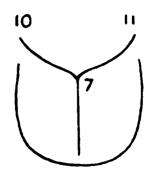


FIG. 2.

This skin was dissected towards 1, and the penis with the reflected skin attached, dissected out of the tumour as far as the root. The attached skin is found to be capable of covering in nearly the whole of the penis, and it fits as accurately as the finger of a glove. From 3, the incision is carried in a curved direction outwards on each side, and round the back of the tumour as indicated by the dotted line, taking care to leave sufficient flap to form the new scrotum, but not too much. It is, perhaps, more easy to err on the side of too little flap. This skin flap is dissected well towards the perineum and outwards in front as in 2, 3, 8, and 2, 3, 9. The incisions are then made to release the testis as before, and the tumour is cut away from before backwards. Each large group of vessels is better transfixed and tied before division. This results in a very much smaller loss of blood than by cutting away first and picking up the vessels afterwards. After removal of the tourniquet and ligature of the remaining vessels, the pointed process of skin at 3 is sutured to 2, and accurately closes that angle.

The edges of the scrotum behind are rolled together and sutured from below upwards as far as 7 (fig. 2) by continuous catgut suture. An occasional supporting suture of wire is very useful. The testes are now

replaced, and point 4 (fig. 1) is secured to 7 (fig. 2), and the edges 5-4 to 10-7 and 6-4 to 11-7. On the upper surface, 3-5 and 3-6 are sutured to 2-8 and 2-9. Four cases (two complicated by inguinal hernia) were done on Sunday. The ligature and suture material ran out after the fourth or fifth case. This was a serious position. Some of the patients had come from long distances.

Search disclosed a skein of ordinary pack thread. This was quickly wound on glass slides and boiled; by its aid we were able to carry on.

On Monday morning another case of scrotal elephantiasis, complicated by a large hernia, and a big "scrotal hernia," arrived; both very anxious to be operated on. They were not disappointed, and one was able to catch the 11.20 train back to Freetown.

In forty-eight hours, seven cases of elephantiasis and four cases of inguinal hernia were operated on.

I believe that many of these so-called elephantiases are really enormous hydroceles. In these cases the skin is not infiltrated by the dense material which one meets with in genuine elephantiasis. It is quite soft and strips easily. In some, however, there is a quantity of gelatinous material in the connective tissue, which may possibly be early elephantiasis. The operation which is required in these cases is, however, identical with that which is necessary in elephantiasis scroti, but is much easier. The after results were quite as good as is usual in these cases.

Preparation of the skin consisted in freely painting the whole tumour with 10 per cent. spirit iodine, but only one coat should be given in case the skin is thin; probably 3 per cent. would be strong enough. A couple of coats may be given to the skin of the thighs and lower part of the abdomen. Such luxuries as operating towels and gowns were not available. One's theatre kit consisted of a pair of mosquito boots, short drawers, and cotton shirt.

It is to be hoped that the Colonial Government will soon establish a large central hospital in the Protectorate. Elephantiasis is everywhere prevalent. Such an institution would do an enormous amount of good in relieving large numbers of unfortunate and grateful people from the discomfort (amounting in bad cases to a living death) attendant on this trouble.

BROMIDROSIS OF THE FEET.

By Major C. H. HALE.

Royal Army Medical Corps.

My apology for writing this short article on the treatment of the above disease is as follows: A short time ago the subject cropped up in conversation with a certain Lieutenant-Colonel of our Corps, and when I explained to him the treatment which I have used for a good many years, always with complete success, he replied that he had never heard of it, and suggested that I should send it to the Journal.

I came home and searched my books for information on the subject, with the following result.

MANUAL OF CHIROPODY. *Official Copy*, 1907 (p. 32).

Sweaty Feet.—"In some persons the production of sweat is excessive, so that when marching, their socks and boots become soaked with moisture, the feet sodden and inflamed. In many cases it is often due to uncleanliness, the dirt and sweat becoming daily more concentrated and more irritating, and so causing a greater flow of perspiration. Not only are sweaty feet exceedingly unpleasant, both to their owners and to those who must be near them, but they are, in addition, soft feet, and so specially prone to all the ills that feet are heir to.

Treatment.—"For sweaty feet absolute cleanliness and a generous use of soap and water is of the first importance. Absorbent socks should be worn and frequently changed. The frequency of changing will depend upon the severity of the condition, and will necessarily differ with different individuals. In all cases another (and when possible a clean) pair of socks should be put on each morning, and again at the end of any march. The pair used during the day, or march, can be washed, or at least dried ready for use next time. The boots must also be well dried and carefully dubbed or softened. A second pair of boots, or at least a pair of canvas shoes, should be carried for use at the end of the march by all affected with such feet. Bathing the feet with vinegar and water, alum and water, spirit and water, or with lead lotion, often helps to check excessive perspiration. Under medical supervision tincture or liniment of belladonna may prove useful."

* * * *

Needless to say that after reading the above, I sought for further information, and after going over the indices of several books, I found the following in Dr. Wm. Bain's "Text-book of Medical Practice, 1904," under the heading of *Hyperidrosis:* "This also is usually a secondary condition due to some very obvious defect in health. In many cases it is limited to the hands and feet, and may then be only a functional nervous phenomenon, or may point to some local cause for irritation, which is at the bottom of the trouble. In the cases where it especially affects the feet, the secretion is liable to undergo a peculiar form of putrefaction with the production of a most nauseating smell, and the condition is then known as bromidrosis. In such cases it is well to look to the condition of the veins and musculature of the leg, and especially to the condition of the arches of the feet—slight flat foot and the discomfort thereby produced being often responsible for the excessive sweating, and causing the disease to reappear again and again until this error is corrected

"Constitutionally acid mixtures containing iron and quinine are often useful, and belladonna has been recommended. Locally the parts should be dressed with diachylon ointment spread on linen until the whole of

the sodden horny layer is shed, when the hose may be thoroughly dredged with a boric acid and salicylic acid powder (pulv. acid boric, 1 ounce, acid salicylic 10 grains).

"It is important that all socks and stockings should be boiled to get rid of the organisms causing the putrefaction, and the boots themselves disinfected by spraying the insides of them with formalin."

* * * *

Not long ago, I saw a case in a hospital of a man who had been over three weeks there under treatment, and was not cured. The treatment I am about to describe is so absolutely successful that even in the worst cases I do not admit them to hospital, but detain them for one day, and when I have satisfied myself next morning that my instructions have been fully carried out, I let them return to duty that day, and tell them to come and see me in a week if any signs of returning disease are seen. I cannot recall a single case of relapse.

As regards the cause of the disease, I have no doubt, personally, that it is due to a specific germ, but is undoubtedly brought on by neglect of cleanliness and wearing dirty socks which have been dried frequently without washing; on the other point, *re* flat foot, I agree with Dr. Wm. Bain that in flat-footed soldiers it is far more common.

Hyperidrosis and bromidrosis of the feet seem to be one and the same disease; if the former is neglected, the latter becomes the final and most objectionable form of the disease. The red-glazed and sodden appearance of the soles in a well-marked case are too well known to need any detailed description.

Treatment.—Patient detained for the day, but first sent back to barracks for all his socks, boots, and shoes. All socks to be soaked for one hour in 1 in 2,000 perchloride solution, and then well rinsed three times in hot water, and finally well washed. The inside of soles, vamps, quarters, and counters of boots to be painted with the following solution by a camel hair brush.

Acid salicylic	1 ounce.
Methylated spirit	4 ounces.

The shoes to be similarly painted. The feet to be well washed, and then thoroughly dried and painted with the above solution over the whole of the red area of soles, heels, and sides of the feet, not omitting any red patches which may be found between the toes and under them. The feet, after being thus painted, look thoroughly "snowed" from deposit of salicylic acid when the spirit has evaporated. A dried, clean, or new pair of socks can then be put on, and next morning the feet are repainted in the same way. When the feet are inspected, the great change from the former raw, grazed, sweaty surface is very evident. The Medical Officer, at his inspection of the feet, should thoroughly satisfy himself that there are no red areas between the toes that have not been treated, and if any are found, they should be at once well painted over.

I can honestly say that I have not met with a relapse of this disease after the above treatment, and I put it down as greatly due to the patients feeling such relief on being cured that they afterwards carefully carry out the details of cleanliness of socks and feet themselves.

I consider that the knowledge of the treatment of this repulsive disease is such that not only does it justify my writing this article, but it holds out a hope of this disease entirely disappearing under "causes of admission to Hospital" in the British Army; and finally it means in a large campaign that a very considerable number of men could thus be effective at their posts who might otherwise be on the sick list.

AN INTERESTING CASE OF SUBDURAL HÆMORRHAGE AT MILITARY HOSPITAL, COLCHESTER.

By Major F. W. BEGBIE.
Royal Army Medical Corps.

Private M., of the 8th Hussars, was brought into the Military Hospital, Colchester, on September 6th, 1909, suffering from the effects of a fall in the gymnasium.

It appeared that the patient was walking along one of the Swedish planks, raised some distance off the floor, when he slipped and fell to the gravel, hurting himself in the small of the back. I saw the patient an hour after admission, and carefully examined him. He was quite conscious, had never been more than shaken by his fall, and complained of no headache, or any other pains, beyond the pain in the back, and difficulty in turning over in bed. He was ordered hot fomentations to his back, given a dose of calomel, and told to remain quietly in bed. He had no rise of temperature, his pulse-rate was 60, and pupils were normal. On September 7th and 8th there was no change to note, beyond a gradual diminution of the pain in the back.

On September 9th there was a slight rise in temperature to 99·4° F., and he vomited at 7 a.m. He did not, however, complain of any headache or nausea; on the contrary, stated he felt much better.

September 10th.—On the morning visit, noticed that the right pupil was dilated, but examination of his eyes showed no abnormality. He complained of slight headache over the right side of his head, which became worse as the day advanced, and I had him removed into a small dark room and ordered him doses of potassium bromide at 5.30 p.m.; he vomited, and almost immediately afterwards was seized with a fit of an epileptic nature, which lasted five minutes. The spasm began in the right side of the face, and passed quickly to the left arm and leg. At 7.50 p.m. he had another attack, lasting two minutes. Between the attacks he was drowsy, but conscious and able to answer questions put

to him. His head was now shaved and a strong purge given. Preparations were made to trephine, should another convulsion occur.

On September 11th the patient was much better, headache had disappeared, pupils were almost equal. He passed a quiet day, was conscious, but drowsy.

September 12th.—Good day, but during the night of September 12th to 13th was very restless, and towards 9 a.m. on the 13th had four fits in quick succession. He was at once taken to the theatre, and the skull trephined, between the right parietal sensori-motor lobe and the sensori-motor area. On removing the crown of bone, the dura mater was found black in colour and immovable. It was incised, and a clot of blood, with considerable laceration of neighbouring brain matter, was disclosed. Hæmorrhage became profuse, and could only be controlled by enlarging the trephine wound, and under-pinning the bleeding points. After a few minutes pulsation was seen to return in the first-noticed immobile portion, and the wound being lightly packed with a gauze drain, the end of which was brought out at the lowest part of the semi-circular incision, the flap was returned and the wound closed by sutures.

September 14th.—Wound required to be repacked two or three times on account of the hæmorrhage. No more fits or twitchings, conscious, but drowsy, ordered calcium chloride.

September 15th.—Pulse, 56; temperature, 99·2° F. Passed a good night, and hæmorrhage less.

September 16th.—Gauze drain removed, pulse 60, temperature the same, hæmorrhage slight, no fits, slept well, and quite conscious.

September 19th.—Sutures removed, wound healed. No headache and no fits.

September 26th.—Ordered solid food, doing very well.

October 16th.—Removed into a general ward, feels quite well.

October 20th.—Up and walking about. Has had no return of headache since the operation.

November 2nd.—Discharged cured, on furlough.

Report.

TRANSACTIONS OF THE BOMBAY MEDICAL CONGRESS, 1909.

By Major W. S. HARRISON.
Royal Army Medical Corps.

This Congress, which owed its initiation largely to His Excellency Sir George Sydenham Clarke, Governor of Bombay, was opened on February 22nd, 1909, and lasted for a week. The ground covered in the time was enormous, as one may gather from the fact that the volume of transactions runs to 632 quarto pages. In the following brief summaries no attempt is made to deal with any papers except those which contain matter more or less new and interesting.

There were several papers read which provided excellent epitomes of present knowledge on particular subjects, and those who are anxious to find out the general position of affairs in, say, trypanosomiasis or spirochætosis, cannot do better than begin with the papers dealing with these subjects, which are included in the transactions of the Congress.

Cholera.—Rogers (Leonard) read a paper on cholera with especial reference to its treatment. In the diagnosis from ptomaine poisoning he drew attention to the leucocytosis of cholera as a distinguishing feature. He found that the loss of fluid from the blood averaged 64 per cent. in fatal cases, 52 per cent. in those cases which required transfusion but were not fatal, and 35 per cent. in milder cases not needing transfusion. He pointed out that the loss of salts went on along with the loss of fluid, and that in fatal cases there were only 0·6 to 0·7 per cent. of chlorides in the blood fluids, while if the chlorides were as much as 1 per cent. the patient generally recovered. Evidence of a mechanical block in the kidneys was found in the fact that while a pressure of 20 to 30 mm. mercury is enough to cause saline solution to pass through a normal kidney, a pressure of 90 to 100 mm. was required to pass fluid through the kidney of a patient dead of uræmia after cholera.

He emphasised the value of opium in the pre-collapse stage, one or two doses only; it should not be continued beyond this on account of the risk of accumulation in the intestine and absorption of a fatal dose when collapse passes off. He recommended the use of a hypertonic solution of salt (120 grains sodium chloride and 3 grains calcium chloride to the pint). In mild cases he gives enemata of this, ½ to 1 pint every two hours, as soon as urgent diarrhœa has abated. In the more severe cases he recommends intravenous injections of 4 pints, repeated if necessary; the idea of using the excess of salts is to keep the fluid in the tissues. For unskilled workers he recommends intraperitoneal injections of the same fluid, and he has devised a cannula for the purpose. Uræmia

usually occurs when the blood-pressure falls below 100 mm. Hg., and he recommends *hypodermic* inoculation of adrenalin and digitalin to raise blood-pressure where necessary. The mortality of 175 cases treated on these lines was 33 per cent.

Diabetes.—Von Noorden gave details of his oatmeal cure for diabetes. It will not act in all cases, but in some does very well. The patient's urine is first cleared as nearly as may be of sugar by strict diet. If this does not act the patient is given two "vegetable days." With a diet consisting of tea, coffee, without milk or sugar, meat broth, five eggs and five yolks, fresh vegetables, butter, bacon, fat or oil, lemon, vinegar, mineral waters, half bottle claret, one or two small glasses cognac.

The *oatmeal cure* consists of 250 to 300 grammes oatmeal daily (as porridge every two hours), 200 to 300 grammes butter, 100 grammes vegetable proteid or eight eggs, nothing else except coffee, tea, lemon juice, old wine or brandy. "Three oatmeal days" are followed by "two vegetable days" and so on. When sugar is absent fish can be added to the diet on vegetable days and, if that is not followed by reappearance of glucose, cooked meat, never more than 200 grammes; later on one may try a little ordinary carbohydrates, *e.g.*, 60 grammes potato. Under this treatment 28 per cent. of his cases lost their sugar; the cure works best in children and persons under 40. If nephritis is present, the cure is contraindicated; if diarrhœa occurs, 5 drops of the tincture of opium is given five times a day. When coma supervenes or threatens the oatmeal cure often checks it; in addition free use of carbohydrates and alkalies is needed for this condition. The disease is not cured but kept down by repetition of the cure four to five times a year for a week, viz., two oatmeal, three vegetable and two oatmeal days. He attributes the result to some substance in the oats which stimulates pancreatic secretion and has found that alcoholic ether extract of oats prevents the glycosuria which follows on injection of adrenalin in dogs.

Dysentery.—Forster read a paper on dysentery, by which he means any ulcerative colitis. He found bacillary dysentery most common in gaols.

Diagnosis of Bacillary Dysentery.—The stools in the acute stage are devoid of fæcal matter, the mucus contains a large leucocytic exudate and no amœbæ are to be found unless magnesium sulphate be given. Pyrexia is the rule in early stages.

The agglutination test is not of much value except when positive. Amœbic dysentery forms 18 per cent. of gaol cases. The stools always contain fæcal matter as well as slime. Uncomplicated cases have no pyrexia. The mucus is generally grumous and free from leucocytes. In his opinion it is impossible to distinguish the various forms of amœbæ.

As other dysenteries he included: Verminal dysentery, tubercular, leprotic, kala-azar. In his opinion, bacillary dysentery is spread chiefly by man to man, infection being by carriers. The germ is very easily destroyed by light, drying, &c.

A case of dysentery should not be discharged, till when on solid food the stools have been normal for fifteen days and till the patient has no tender spots along his colon.

Result of vaccine therapy: 36 cases, 2 deaths without vaccine; 114 cases, 1 death with vaccine.

Castellani reported some experiments on the use of a mixed vaccine of *B. typhosus* and Shiga's bacillus. He also recommended the use of living cultures of attenuated bacteria as vaccines, the attenuation being brought about by exposing virulent germs to a temperature of 50° C. for one hour.

Typhoid Fever.—Davidson gave an account of typhoid fever as seen in Travancore, and among other things stated that the abdominal reflex sign of Rolleston was present in 93 per cent. of his cases. He also said that the blood-pressure is consistently low in contrast to the condition in malaria, where it is high.

Van Loghem reported a case of typhoid fever where the *B. paratyphosus* B was isolated from the blood during life; the agglutination test being positive in a dilution of 1 in 1,000 for both *B. paratyphosus* B and *B. typhosus*. *Post mortem* there were typical typhoid lesions, and typhoid bacilli were isolated but no *B. paratyphoid* B.

Malaria.—Ronald Ross read a paper on the practice of malarial prevention; he gave in detail the method of attacking the problem. For prevention he recommends mosquito destruction by drainage, &c., for large communities, and quinine distribution for villages and isolated communities; this latter because the cost of drainage is as great as in a town or large station and has to be borne by fewer inhabitants. He especially recommends, by way of attacking the main source of infection, the periodic examination of school children and the giving of systematic courses of quinine to those found infected; dose, 1 grain daily for each 3 years of age, given in freshly made pills. The paper is full of practical detail, and should be consulted in the original by all who have to concern themselves with malarial prevention.

Christophers and Bentley spoke on the relations between blackwater fever and malaria, which they likened to the relations between alcoholism and delirium tremens. Though not always inevitable, they are often precipitated by some outside cause; in the case of delirium tremens, for example, by a broken leg. They suggested that the accident is due to the production of an autolysin, but the arguments which they bring to support their theory are no more convincing than those which have been brought to support other explanations of this disease.

The same authors gave a paper on the "Human Factor in Malaria," in which they showed in graphic fashion the effect of bringing together large bodies of labourers, &c., in producing severe epidemic malaria; these aggregations of people act by bringing large masses of infected and susceptible people together under conditions where the Anophelines have

the very best opportunities for rapidly transferring the disease from one to another. They see in this factor a very serious danger for tropical countries arising from industrial expansion.

James gave the results of anti-mosquito measures in Mian Mir, from which one would gather, if one did not know more of the history of that station, that the stoppage of irrigation and filling up of breeding places had resulted rather in an increase of Anophelines and malaria. The periods he compares are October, 1901, and October 1908; the last after the phenomenal rains of that year!

Surgeon-General Hamilton drew attention to this point, and stated that during the rain of 1908 the water had lain inches deep for days together, that the drainage of the station was quite inadequate to deal with a heavy downfall, and was in fact wrongly planned, since the drains ran to the north and west, while the general drop of the country was from north to south. He also pointed out that Major James in his statistics had compared an exceptionally healthy year in the irrigation period with an exceptionally unhealthy year after the irrigation was stopped.

Musgrave (of Manila) referred to the result of anti-malarial measures in Panama, where the incidence of malaria had gone down from 143 to 21. He rather dryly put it that if anti-mosquito measures had failed at Mian Mir, it meant that water was present somewhere where it should not have been. Christophers and Bentley supported James's views, and urged the value of quinine prophylaxis. Rogers also spoke in favour of quinine prophylaxis, and pointed out that James's use of October, 1908, to show the effect of the anti-mosquito measures was unfair, since in that year the rainfall was 50 per cent. above normal (33 inches against a normal 21, most of the excess falling in July and August and half September).

Ronald Ross, commenting on James's paper, said that the reduction of malaria in Havana, Ismailia, Panama, and the Malay States, was due to anti-mosquito measures, and that quinine prophylaxis was only a small factor in those places. At the same time he was in favour of all measures being used, and quinine prophylaxis was specially suitable for rural districts.

Dr. Powell analysed James's statistics for hospital admissions, and showed that while admissions in 1904 (before irrigation was stopped) were 553 per 1,000, in 1905 they were 52, in 1906 they were 296, in 1907 they were 135, while in the notorious 1908 they were 576, or about 4 per cent. above the rate for 1904; but in a body of 2,400 sepoys under his care in that year at another station the malarial rate for 1908 was treble that for ordinary years. Apart from the exceptional year, he was inclined to suggest that some reason for the rise might be found in the slacking off of the activity of the mosquito brigades.

Plague.—Shiga read a paper by Kitisato on rat-fleas and plague in Japan, in which it was shown that plague in Japan was chiefly carried by

Pulex cheopis, which, although rare in Japan as a whole, is prevalent in places where plague has occurred. The author was of opinion that the disease had been imported with the flea.

Lamb gave a *résumé* of our present knowledge of the etiology and epidemiology of plague. This paper gives in brief the whole line of proof that plague is carried from rat to flea, and from flea to man; and is worth reading by those who have not had the opportunity of studying the reports of the last Plague Commission.

Choksy described the clinical symptoms of plague septicæmia, and the acute or subacute marasmus which often develops in those patients who survive the first week. In his opinion, marasmus is due to intoxication with the products of broken-down plague bacilli.

Liston read a paper on the prophylaxis of plague. He showed how the habits of the people and construction of their houses encouraged the multiplication of rats by providing them with food, shelter, and defence from enemies. He pointed out that trapping, if carried out, must be done thoroughly and systematically, traps equal to not less than 2 per cent. of the population being regularly set. Plague, according to Liston, is carried by rat-fleas from village to village in the clothing of human beings, and destruction of vermin in clothing and baggage of travellers is a necessary precaution. He suggested that the proper periods for prophylaxis campaigns are when the epidemics are in a period of comparative quiescence. His paper was a plea for dealing with plague on scientific lines in the light of recent knowledge. For this reason he condemned the isolation of sick in hospitals as wasteful and useless, both for the prevention and for the better treating of the patient; in this, perhaps, he went too far, there is some advantage in careful treatment on general lines, even if the treatment is not "specific." Disinfection also he condemns as wasteful and futile, since it fails to get at the bacilli in the bodies of fleas and rats, and equally fails to kill these carriers. He looks on evacuation as mostly unnecessary, seeing that in 87 per cent. of cases only one occurred in one house, but he does not refer to the evacuation, not of the single infected house, but of all the houses of the group, infected or not. He advocated a redistribution of the money allotted to plague work, giving most to those measures which he classed as essential, viz., rat destruction, disinfection of travellers' clothes, inoculation, and sanitary reconstruction, with only a minimum for the non-essentials, such as disinfection of houses, evacuation, and segregation of the sick, &c.

Gordon Tucker, speaking as a practical "slum worker," pointed out the very great practical difficulties there were in carrying out Lister's suggestions. With regard to evacuation, he gave it as his practical experience, that to allow the family to remain in a plague-infected house was to court disaster. He strongly advocated evacuation, the contacts being moved into huts close to their old houses.

Browning Smith, from his experience in the Punjab, advocated rat

destruction by use of both poisoned baits and traps. He pointed out the difficulties in the way of prevention of spread by travellers, and showed that although inoculation gave such good results it was next to impossible to get an adequate number of people to submit to it, except in presence of an epidemic. He showed that the work involved in plague prevention in India was too great for any possible staff to accomplish, and that in any policy adopted the action taken must come from the people themselves, guided and instructed by those capable of giving advice and instruction.

Hutchinson referred to the practical immunity of the North Kanara Collectorate from plague in spite of free intercommunication with plague-infected centres and repeated introduction of plague. He suggested that it was probably associated with the method of building houses, each detached from its neighbour, and with the practice of keeping cattle, &c., in out-houses and not in living rooms, as is so frequently the case in India.

Choksy gave his experience of serum therapy in plague, and claimed a reduction in the mortality rate by 10·5 per cent., but much better results were got when cases were treated within the first three days; cases treated on the first day giving a mortality of 25·30 per cent. only, the mortality rising with each day of delay in beginning treatment. He recommended subcutaneous injections in doses of 100 cc., three such doses being given within the first forty-eight hours; the use of further injections depending on the patient's condition. Choksy also read a paper on the symptomatic treatment of plague, which is too detailed to epitomise here.

Standage described the inoculation campaign in Bangalore, and showed some very good results. His figures were 40,573 inoculated, with 33 plague attacks and 13 deaths, against 49,026 not inoculated, with 1,640 attacks and 1,391 deaths.

Lloyd read a paper on the "Races of Indian Rats." From his experience *Mus decumanus* is almost entirely confined to the ports, *M. rattus* being the common variety. From the striking constancy in the general family likeness of the rats found in single houses or villages, he concluded that rats, as a rule, stick closely to their original home, and do not wander to any extent from house to house, or from village to village.

Buchanan urged the systematic keeping of cats as a means for reducing the rat population.

Kala-azar.—Donovan spoke on kala-azar in Madras; he had failed so far to confirm Patton's findings of herpetomonas forms in *C. rotundatus* after sucking blood heavily charged with kala-azar parasites. He has abandoned spleen puncture, having had three deaths in 170 cases as a result of the operation. He claims to have found the parasite in the peripheral blood in 93·22 per cent. of all cases, the secret lying in the method of spreading the film, which must end abruptly in a straight edge and not in "tails"; and it is in this final edge that the infected cor-

puscles are found. The examination of, on an average, two slides on two successive days has given the above percentage. With regard to treatment, he had one recovery following the use of 1 cc. of 20 per cent. of fuchsin, twice daily for six months. Two cases recovered after severe inflammatory infections.

Rogers referred to his use of staphylococcus vaccine with a view to producing a leucocytosis, he thought he had got some promising results among his fourteen cases.

Foster stated that he had examined 1,000 blood films from kala-azar cases, and failed to detect parasites.

Bentley described the devastating epidemics on tea gardens in Assam, where as many as three-quarters of the population of a garden were wiped out in five years. The mortality, at the height of the epidemic, was 95 per cent., but when the epidemic was declining the mortality dropped to 50 per cent. He preferred spleen puncture for diagnosis, and had had no accidents; examination of the peripheral blood had given poor results in his hands. He was sceptical about the results of any treatment, as cases sometimes recovered spontaneously.

Spirochætosis.—Two papers, one by Choksy on human spirochætosis, and one by Carter on spirochætosis in mammals, were chiefly concerned with an epitome of our present knowledge on this subject. They should be useful for reference, especially the paper by Carter, which is followed by a bibliography.

Oriental Sore.—Row described the cultivation of *Leishmania tropica* on blood serum at room temperature. After twenty-four hours the micro-nucleus is seen to have become fused with the macro-nucleus, and the cytoplasm stains a pale bluish tint, while the whole parasite increases in size and becomes somewhat pear-shaped. The nucleus now elongates to a kidney shape or becomes tailed at one end, then throws off a bud from its free side; this increases and carries with it its own share of hyaloplasm, thus producing a fission form of two individuals, which further divide until a group of eight elements is formed. At the end of thirty-six hours were found large masses of these division forms, which, when fully developed, resemble bunches of curved bananas. The micro-nucleus of these preflagellate forms is budded off from the nuclear mass on the side next to the broader anterior end of the parasite and travels towards the anterior pole. Between forty-eight and seventy-two hours the parasites become flagellated by the extrusion of a flagellum from the anterior end. The flagellum originates in the micro-nucleus and is one and a half times the length of the body. The parasites are actively motile, the motility being due entirely to the movements of the flagellum; they remain alive for about twenty-four hours, and then rather rapidly disintegrate, so that at the end of one hundred and twenty hours all traces of the parasites have disappeared from the culture. The cultural forms show differences from those of *L. donovani;* they are much bigger, they are more resistant to external

conditions and have been cultivated three days after removal from the body. The flagella are much longer and show more undulations.

The parasite in culture is able to survive bacterial contamination to some extent, and the development into flagellates only takes about half the time that is required for the development of kala-azar parasites. The best medium is human blood serum, and the optimum temperature is 25° to 28° C., which is higher than that for kala-azar parasites (22° C.).

Biting Flies, &c., as Carriers of Disease.—Greig gave a *résumé* of modern knowledge of the various tsetse-flies and the diseases caused by them. Carter also gave a compilation dealing with transmission of disease by ticks and biting flies in general.

Howlett read an interesting paper on the "Habits, &c., of the India Sand-flies (Phlebotomus). He suggested that the fact that the period of their maximum prevalence coincides in many districts with the most unhealthy period of the year, when short fevers are common, called for further investigation.

Snake Venoms and Anti-venomous Sera.—Lamb read a paper on this subject, in which he again emphasised the specificity of anti-venomous sera; he also pointed out that a cobra could inject as a maximum 350 mgm. of poison, while 1 cc. of the serum issued from Kasauli when mixed *in vitro* was only strong enough to neutralise 1 mgm. poison; it was therefore necessary to give large doses of serum intravenously.

For viperine intoxication he recommended the use of adrenalin chloride to counteract the vaso-motor paralysis. Wall, in his article, showed that in a large number of cases of snake-bites the symptoms were due to fright alone, and instanced cases of bites by perfectly innocuous snakes which were followed by death from fright; he gave the differential diagnosis between this condition and the symptoms of snake poisoning.

In the wound itself, if poison has been introduced there is invariably pain, swelling and bleeding, and purplish discoloration of the subcutaneous tissues when exposed by incision. The pattern of the punctures is useless for diagnostic purpose. He quoted experimental evidence from Fayrer and A. J. Wall which seemed to prove conclusively that the much advocated ligature was absolutely useless as a treatment for snake-bite, also experiments to show that immediate amputation of a bitten part failed to prevent death from snake poison. He suggested the intravenous injection of 5 per cent. permanganate of potash, but did not appear to have tried it himself! Lastly, he advocated calcium chloride for treatment of bites by viperine snakes and persistent use of artificial respiration for cobra bite.

Lauder Brunton read a paper on the action of snake venom, in which he advocated the use of his "snake lancet," with the rubbing of permanganate of potash into the wound.

Leonard Rogers reported twenty-nine cases of snake-bite treated by this method, with twenty-eight recoveries.

Horton stated that in Kathiawar forty-one cases had been reported as treated by the " snake lancet," with one death, but he was not satisfied as to the identity of the snakes in these cases; he recorded two cases where the identity of the snake was certain; these were treated by incision and application of permanganate, but both died.

Lamb pointed out that the experiments of Rogers, in which he used a hypodermic needle for injection of the venom, did not copy the natural method, and that Rogers had not yet published the results of his promised experiments on the protective influence of permanganate after actual snake-bite.

Lamb also reported three experiments made by himself on monkeys, in which the permanganate was applied to the opened wound three minutes after a cobra bite; in all three cases the monkeys died. He pointed out that the conditions of these experiments were infinitely more favourable to the treatment than any likely to occur in Nature.

Powell advocated the removal of as large a portion of the tissue round the bite as possible.

Rogers, in reply, pointed out that in Lamb's experiment the bite was made into muscles, whilst in man it usually occurred on the extremities. He also showed that Lamb's monkeys must have got a very much higher dose in proportion to their weight than a man was likely to get.

Actinomycosis.—Hooton and Powell each reported three cases of actinomycosis in India, a disease which appears to have been seldom reported in that country. It is comparatively rare also in animals, since at the Bombay Veterinary College there is generally only about one admission a year on account of it.

Beri-beri.—Braddon read a paper on beri-beri; he reported that in Malay although 250,000 cases had been treated in ten years, not one occurred among non-rice eaters. Of these cases, 97½ per cent. occurred among 300,000 Chinese, who ate stale uncured rice, while a similar number of Tamils and Malays provided only 1½ per cent. of the cases of beri-beri. The Malays only eat freshly decorticated rice, prepared as wanted from day to day, while the Tamils eat a parboiled (cured) rice. He reported some observations made by Fletcher at the Kuala Lumpur lunatic asylum. Half the sixty inmates were given uncured rice, and the other half took cured rice; in all other respects their conditions were identical. Beri-beri occurred only among those eating uncured rice during the two and a half years that the observation lasted. He gave details also of Fraser and Stanton's experiments, which have already been published elsewhere (*Lancet*).

Evidence showed that the intensity of the poisoning depended on the amount of rice consumed, the length of time during which it was consumed, and the age (staleness) of the rice used; it also varied with the resistance of the individual, with use (toleration), and with the degree to which the rice is diluted with fatty and proteid foods. The

writer gave a complete account of the symptoms of the disease, and (quoting from the Norwegian Commission and from Holst) distinguished it from pelagic dropsy (ship beri-beri) by the fact that, in the latter, symptoms of nerve lesion are invariably absent. As regards prognosis and treatment, in his opinion no moderate case of beri-beri should die if he survived the first twenty-four hours after coming under treatment, which consists in immediately stopping the use of uncured rice, and in clearing what remains out of the intestine by use of castor oil. He also strongly recommended the use of atropine; digitalis he looked on as dangerous, and strychnine and arsenic as useless.

Kenneth Macleod discussed the relations between epidemic dropsy and beri-beri, and concluded that they were distinct diseases, the principal points of distinction being the sudden onset, the presence of initial fever and of rash, the absence of definite symptoms of nerve lesions, and the anæmia in epidemic dropsy. McGill referred to an epidemic of "neuritis" with œdema, affecting sixty-one men of a regiment at Poona; all the cases occurred in heavy drinkers, and fifty-one occurred within four months. He was inclined to attribute the epidemic to beer-drinking, but was unable to account for the epidemic character of the outbreak.

Musgrave (Manila) suggested, as a result of experiments in Manila, that beri-beri was due to an organism growing on rice and resistant to boiling.

Powell spoke in favour of a toxic cause for beri-beri, and compared it with such diseases as alcoholism, ergotism, and pellagra; many cases of alleged beri-beri had been found to be due to ankylostomiasis.

Leprosy.—Shiga read a paper on leprosy in Japan. The number of lepers in Japan in 1906 was 23,815, or 5 per 10,000 population; these were distributed among 22,887 families, giving 104 lepers per 100 infected families. He had recently succeeded in growing an acid-fast organism from lepra nodules by inoculating on to glycerine potato agar containing human serum. Most of the bacilli were not acid-fast at first, resembling rather diphtheria bacilli, but on subculture they were perfectly acid-fast; after two to three weeks' culture, the acid-fast property decreased and eventually disappeared. Animal experiments gave negative results.

Unna described two methods for staining in leprous tissue the dead bacilli which have lost their acid-fast properties. The details are too long to be given here, and those interested are referred to the original paper.

Deycke Pasha reported on the results of the use of nastin in leprosy. Injection of this substance (which is a fatty acid isolated from *Streptothrix leproides*) is usually followed by reaction in the leprous nodules, the bacilli of which are found to lose their acid-fast properties and to break up; this is accompanied by phagocytic reaction of the tissues; injection

of hetol before the nastin greatly increased the intensity of the reaction. Later he found that benzoyl-chloride added to the nastin in certain proportions had the same effect, and after experiment he arrived at a solution (nastin B) which was therapeutically active, but did not cause dangerous reactions.

Williams gave the results of Deycke's treatment in five cases of leprosy, all of which showed great improvement, especially in regard to their general health and to disappearance of ulcers.

Jackson also reported on the results of treatment in nine cases, all of which had improved after fourteen weeks, some more, some less.

In the discussion some doubt was thrown on the diagnosis of one of the cases of which Deycke had shown photographs, and three speakers gave it as their opinion that it was a case of yaws.

Smith and Bisset gave a very complete *résumé* of our present knowledge of leprosy, and reported on the results of nastin B treatment in six cases, all of which showed improvement.

Rodriguelz gave details of the results of nastin B treatment in thirty-five cases, most of which showed improvement; his paper is illustrated by photographs of six cases before and after treatment. They are certainly very striking. The same writer mentions a curious fact that when lepers ate pork it was followed by fever and inflammation of the tubercles and glands; but when the same patients had been under nastin treatment for some time, they were able to eat pork with impunity.

Streptothricosis.—Musgrave and Clegg presented an important paper on streptothricosis, with especial reference to the etiology and classification of mycetoma; it is much too full of detail to be epitomised here, and should be studied in the original. Their conclusions were that the group of diseases known as actinomycosis, streptothricosis, and nocardiosis are caused by one or other species of a streptothrix, and that the terms lumpy jaw, Madura foot, mycetoma, &c., represent only the anatomical distribution of the infections to which any one of the species may belong.

Surveyor also read a paper on Madura foot, in which he attributed the white variety to a streptothrix, and the black variety to a mould. He has not grown the mould, but formed his opinion chiefly as a result of microscopic examination of granules after treatment with hypobromite of soda.

Boccaro also read a paper on the subject, which contained a *résumé* of our present knowledge of Madura foot.

(*To be continued.*)

Reviews.

AUSTRO-HUNGARIAN ARMY REGULATIONS FOR THE CONVEYANCE OF SICK AND WOUNDED BY RAIL. (*Vorschrift für Sanitätszüge des k. und k. Heeres.*) Vienna, 1909. *K. K. Hof und Staatsdruckerei.* Pp. 197, 7 plates with drawings in text and tables. Price 1s. 10d.

This work is the official manual of hospital trains for the Austro-Hungarian Army; it consists of two main divisions with numerous plates, drawings, and tables. The first division is devoted to "Spitalzüge," which we would call hospital trains. This class of train is fitted up as a travelling hospital capable of supplying all the needs of 144 seriously sick or wounded patients lying down during a journey of several days if necessary, while being transferred from the area of operations to the hospitals in the home territory. These trains are composed of specially constructed goods wagons which are employed for traffic during peace time, but are not allowed to be sent out of the country.

The second division deals with "Krankenzüge," *i.e.*, ambulance trains of an improvised nature and primarily intended to carry sick and wounded short distances, and only to afford such medical attendance as may be absolutely necessary during the journey. These trains may be permanent or temporary, and are made up of ordinary goods wagons.

Each army corps has three of the permanent type of improvised ambulance train, in which the wagons are fitted with some apparatus to support stretchers, and with sitting accommodation; the temporary type of train is made up as required of additional goods wagons with improvised accommodation, when a very large number of cases has to be evacuated rapidly.

In the case of both kinds of train, the directions given enter minutely into every detail concerned with the formation, adaptation, equipment, and *personnel.*

The duties of everyone on the train, from the Commandant downwards, are clearly laid down, and all probable contingencies are provided for. The work affords an excellent guide to those who may in any way be concerned with the formation of a hospital train.

C. E. P.

RHINOLOGY: A TEXT-BOOK OF DISEASES OF THE NOSE AND THE NASAL ACCESSORY SINUSES. By P. Watson Williams, M.D.(Lond.). Longmans, Green and Co. Pp. xvi. and 273. Price 15s. net, with stereoscope, 12s. 6d. net.

In this work one is particularly struck by the amount of information, in a concise and readable form, which the author has succeeded in compressing into a comparatively small space.

The claims of the author, in the preface, that the clinical anatomy of the nose and particularly of the accessory sinuses has been treated with much care, are amply justified.

The manner in which the text has been illustrated, by means of a series of stereoscopic plates, marks a new departure in text-books which

might, with advantage, be followed by other writers, especially in operative surgery. These stereoscopic plates can be viewed by a small adjustable stereoscope designed by the author, and they bring out the various anatomical points and the frequent anatomical variations in the accessory sinuses in a clear and vivid manner. The plates are supplemented by numerous sketches and coloured drawings.

In a good section on diseases of the nasal septum one is glad to see considerable stress laid on the principle of leaving septal deformities severely alone unless they are causing very definite symptoms.

I invite the attention of those interested in prevention of disease to the description of primary diphtherial rhinitis.

The author opens up an interesting problem in the note on the moral and legal responsibilities of patients suffering from disease of the accessory sinuses, and one wishes he had discussed this point at greater length.

An obvious practical point, on which greater emphasis might have been laid, is the washing out of the nasal passages as a preliminary to exploratory puncture and lavage of the maxillary antrum ; in the description of this small operation this point is not mentioned, though it is noted when frontal sinus irrigation is under discussion.

There is an excellent chapter on affections of the eye, ocular and orbital, due to intra-nasal and accessory sinus disease, which I commend to eye specialists.

Dr. Watson Williams' name is well known in connection with the operative treatment of chronic suppuration of the accessory sinuses; consequently, section 13, which deals with this treatment, is particularly good.

The stereoscopic plates again play an important part, bringing vividly before the reader the various steps in the operations and the anatomical variations frequently observed.

The appendix contains a selection of useful formulæ, and directions as to how a *post-mortem* examination for nasal and accessory sinus disease should be conducted. The book is written in a lucid and practical manner, and the author brings the weight of a wide clinical experience to bear on his description of the diagnosis and treatment of nasal and accessory sinus affections.

B. B. B.

THE BACTERIOLOGISTS' AID TO MEMORY. By J. W. S. Seccombe, Captain R.A.M.C. London : John Bale, Sons and Danielsson. Price 3s. 6d. net. Mounted on linen, 4s. 6d. net.

This is a large sheet intended to hang on the wall of the laboratory. The more frequently occurring bacteria are arranged in alphabetical order and their principal characters are given in tabulated form. For the most part the information is correct, but there are some statements which are likely to be misleading; for example, the growth of anthrax in broth is stated to be in spiral threads, and in the column on morphology anthrax is said to have a capsule without any reference being made to the special circumstances under which the capsule is seen. Again, the growth of *Bacillus pestis* in broth is described as a granular deposit, and the smell of tetanus cultures is likened to a "burnt" unpleasant odour ; it is certainly a good deal more like the smell of an ill-kept stable. However

such points as these will probably be corrected in a later edition. The sheet will, no doubt, be found useful by some workers as a means of refreshing the memory on the principal characters of the bacteria described.

W. S. H.

DIE ALTROMISCHEN MILITARARZTE. Dr. Haberling. (*Veröffentlichungen aus dem Gebiete des Militar-Sanitätswesens*, Heft 42.)

This excellent little brochure gives a very complete account of what is known about the military medical services of the Roman Army. Dr. Haberling dips as far back into the ages as the days of Aeneas, and the Siege of Troy, only, however, to reject Japyx, and Umbro, Podaleirios and Machaon, as being legendary individuals. In fact, up till the date of the second Punic War, attendance on the injured seems to have been looked upon as a "dirty job" (sordidum negotium), fit only for women and slaves. The wounded soldier had to rely on his own efforts, or on those of his friends, for assistance and relief. As time passed, however, and more liberal ideas prevailed, some of the men in the ranks would be recognised as more skilful than others, and gradually would be more often resorted to for help. Silius Italicus gives a graphic account of how one of these, Marus by name, himself living in retirement at Perugia, rendered surgical aid to Serranus, the son of Atilius Regulus, under whom he had once served, when the former was wounded and a fugitive, after the disastrous battle of Lake Trasimene. The date of this occurrence was 217 B.C. In 219 B.C. a Greek, named Archagatus, living in Rome, acquired the name of Vulnerarius on account of his extensive practice in military surgery. His methods, however, seem to have bordered on the heroic, and so many of his patients exhibited amputated limbs, that the "baser sort," not yet accustomed to surgical procedure, nicknamed him "butcher," and he found it wiser to change the locality of his practice. Both Julius Cæsar and Augustus recognised the necessity of surgical assistance in the field, and were accompanied by their personal medical attendants, who were at the same time available for general practice amongst the troops. The most interesting part of Dr. Haberling's monograph refers to the period of the Empire, and this is illustrated by a series of inscriptions, either in memory of medical officers of the Roman Army, or recording votive deductions made by them. In the Appendix a list of the names of all military surgeons whose names are known, with the units to which they belonged, is given, also the various localities in which inscriptions have been discovered. Of these, England supplies only two, namely, at Housesteads on the Roman Wall, and at Binchester, in Durham.

Of particular interest are illustrations showing a small case of probes, and portable medicine chests, with partitions for pills or drugs made up in some convenient tablet form. These chests were made of ivory or metal. The social and official status of medical officers, and their training are also referred to. Dr. Haberling is to be warmly congratulated on a most delightful book, which combines an immense amount of erudition and research, in a very readable and interesting form.

C. H. M.

Lessons on Elementary Hygiene and Sanitation with Special Reference to the Tropics. By W. T. Prout, C.M.G., M.B., C.M.Ed. Second Edition. London: J. and A. Churchill. Pp. xx. and 159. Price 2s. 6d. net.

This little book is composed of a collection of lectures on elementary anatomy, physiology, and bacteriology, as well as hygiene and sanitation given by the author at Freetown, Sierra Leone. Apparently, the original lectures were six in number, but they have now been extended to fourteen, and much matter which is extraneous to the subjects of hygiene and sanitation has been introduced.

Under the heading of Typhoid Fever we find the following somewhat bold statement: "It was this germ which killed so many of our soldiers in South Africa. . . . and it all arose from thirsty soldiers drinking water which was not pure." The possibility of the spread of this disease by the agency of flies is mentioned later, but the above-quoted statement is not qualified in any way, nor are the dangers of dust, or the existence of "carriers" referred to at all. In this section the author states that an *antitoxin* was used during the South African War as a prophylactic against typhoid fever; it is evident from his remarks here and in the section on plague that he does not recognise any difference between an *antitoxin* and a *vaccine*.

In discussing the forms of conservancy and their suitability for adoption in towns on the West Coast of Africa, he says that the only practicable system is that of pail closets, which he would use apparently without any earth, ashes, or liquid to cover the excreta, the pails being changed once or twice a week. It is difficult to imagine that such a method could be other than most objectionable, especially in a tropical climate.

However valuable these lectures may have been to those to whom they were originally addressed, they do not appear likely to be of any service to officers of the Army.

C. H. S.

First Aid to the Injured and Sick. By F. J. Warwick, B.A., M.B., &c., and A. C. Tunstall, M.D., F.R.C.S.Ed. Bristol: J. Wright and Son, Ltd. Leather 2s. 6d., paper 1s. net.

This is an advanced handbook of 209 pages, convenient in size, clearly printed and well illustrated throughout. It possesses a good index and the paragraphs, being headed in dark type, are easily turned up for reference.

Part I., 60 pages, deals with Anatomy and Physiology, and contains all that is necessary in a work of this description.

Part II. deals with bandaging, &c., and the immediate treatment of all the common cases of emergency likely to be met with in civil life and requiring immediate attention. The directions for dealing with these cases are clear and free from ambiguity.

The concluding chapters deal with the transport of sick and injured, and contain much that is useful. It is, however, to be regretted that the pages containing the condensed description of the six-bearer drill of the Royal Army Medical Corps Training Manual, 1908, could not have been devoted to the more simple drill shortly to replace it and adapted to any

number of bearers, from six downwards, and which, when published, will render this part of Warwick and Tunstall's Manual out of date.

This should, however, detract little from its value as a work on First Aid, especially for those likely to deal with cases arising chiefly in civil life.

G. D.

Current Literature.

Notes on the Hygiene of European Troops employed in Tropical Expeditions.—In the *Marine Rundschau*, for June, 1909, Dr. zur Verth contributes a long article on the selection of European troops and the preservation of their health in tropical expeditions.

Selection.—Age. Dr. Verth considers that 23 should be the minimum age, not because the older man is less susceptible to disease, but because the older man is more self-reliant and makes a better soldier. Men having recently suffered from any severe illness, those having a tendency to chronic affections, *e.g.*, rheumatism, highly strung nervous individuals, or those suffering from chronic venereal diseases should not be sent to the Tropics.

Clothing.—The colour is important, yellow (*i.e.*, khaki colour) next to white affords the best protection from heat and chemical rays of the sun. The texture should permit loss of body heat and evaporation of perspiration, while at the same time preventing rain from wetting the underclothing. The specially impregnated materials are most useful. Dr. Verth dislikes flannel next the skin, as it irritates, and also soon loses its special properties.

For footgear lace boots and putties are best. Light shoes are necessary for camp wear.

A plentiful supply of soap should be provided for washing clothes and personal cleanliness.

A period of acclimatization is unnecessary. In the field, native houses and old camping grounds should be avoided; in both there is a great liability to infection with tick fever.

Animals should be slaughtered in the evening, and hung till morning. Papaw leaves wrapped round the meat make it more digestible.

Water must as a rule be boiled; in the form of tea it is more palatable.

Boiling takes time, and a supply of boiled water should be carried with the column under the commander's direct control. Filters always break down and are useless.

Marches should take place between 5 and 10 a.m., and not exceed fifteen miles as a rule.

The commander should march on foot and carry a load like his men; he must also personally see that his men have good meals, not merely see rations served out, as badly fed men must break down. C. E. P.

Organization and Management of the Convalescent Home at Carthage for the Garrison of Tunis.—In the *Archives de Médicine et de Pharmacie militaires* for May, 1909, Médecin Major Moutet gives a description of the convalescent home at Carthage for the garrison of Tunis. This was opened on November 15th, 1902. The building is an old Arab house adjoining the Lazaret barracks at Carthage, situated on the sea-shore and commanding a lovely view of the Bay of Tunis. There is a large circular room which is used as a dining-hall and recreation room. Three smaller rooms are used as dormitories. At first food was provided by the barrack canteen keeper, but this arrangement did not give satisfaction, especially as regards the quantity of food supplied; in fact, many of the convalescents obtained permission to mess with the troops in barracks.

A system of messing was established in 1907. Each regiment contributed a certain sum proportionate to its strength for the purchase of kitchen utensils and table necessaries Every regiment makes a messing grant of 20 centimes daily for each of its men at the home. Provisions are purchased at the special rates fixed for the garrison of La Goulet.

By taking advantage of these low rates it has been found possible to provide out of the Government messing allowance and the 20 centimes daily grant two good meals daily and a considerable variation in dieting.

A typical day's menu is: Early morning coffee. *Déjeuner:* Soupe à l'oignon et au fromage; bœuf braisé aux carottes; poissons frits; fromage, biscuits, café. *Diner:* Potage Julienne; épaule de mouton rôtie aux pommes de terre; maccaroni au fromage; salade; figues et dates; café.

The rule that none but convalescents are to be kept at the home is strictly enforced. Should any man become ill and require attendance he is sent back to one of the military hospitals.

C. E. P.

The Adaptation of Motor Vehicles for the Transport of Wounded in War, in France.—An open letter addressed to Dr. Briand, President of the mixed committee appointed to consider the question of the transport of wounded by motor vehicles in war which appeared in the *Revue Mensuelle de Touring Club de France*, is reproduced in the *Caducée* of June 19th, 1909, and also in the *Bull. du S. de S.* of September, 1909. This classifies the available motors as follows:—

(*a*) Motor ambulance wagons belonging to aid societies or certain business firms. These do not require any alteration.

(*b*) Vehicles ordinarily used for passenger traffic; these merely require some simple apparatus to support stretchers and equipment.

(*c*) Light motor wagons employed in business for delivering goods, &c. If these are 7 feet 6 inches in length some kind of apparatus with springs for suspending stretchers is required, or else seats must be fitted to carry sitting-up wounded.

(*d*) Private cars. The Limousin type as also smaller closed cars can be utilised without alteration for the conveyance of sitting-up wounded. The landaulet, *coupé*, &c., pattern can only be used for the conveyance of medical officers. Small open cars not capable of carrying at least three persons are useless as their employment would mean an enormous

increase in the number of ambulance vehicles which must at all costs be avoided.

Dr. Briand suggests that a prize should be offered for the best essay on the "The Adaptation of Motor Vehicles by Improvised Means for the Transport of Wounded in War." Dr. Briand states that of the 40,000 motor cars actually in use in France only some 1,200 would be required on mobilisation, there should, therefore, be an ample supply of vehicles.

C. E. P.

Vaccine Virus.—G. Volpino (*Cent. f. Bakt.*, T. Abt. Orig., Bd. li., Heft 5, September 25th, 1909) has discovered very minute particles in the interior of the epithelial cells of the cornea of a rabbit which has been inoculated with vaccine lymph. These bodies are unaffected by the dissolution of the cell in which they are contained. He has observed that they undergo some development *in vitro*. He regards them as the actual infecting agent since he has noted that the particles are rendered motionless by specific serum and are not influenced by normal blood.

The Bordet-Gengou Reaction in Enteric Fever.—S. J. Zlatogoroff (*Cent. f. Bakt.*, September 25th, 1909, p. 587) states that the complement-fixing reaction gives earlier and more exact indications than agglutination. The immune bodies appear sooner and disappear more quickly than the agglutinins. Both the typhoid and paratyphoid bacilli should be used as antigens. The antigen, complement and hæmolytic system should be controlled and the serum added in varying dilutions. He obtained positive results in 38 out of 39 cases of enteric fever. In 18 of these the Widal test was negative, 1 in 40 dilution.

C. B.

Chemical Tests for Blood.—Kastle (*Bulletin No.* 51, *Hygienic Laboratory*, Public Health and Marine Hospital Service of the United States) gives the history of the various resin and peroxide tests for blood, of which the guaiacum test is the principal example, and discusses their *rationale*. He gives a long list of substances which can give the guaiacum test, and concludes that although a negative reaction is proof positive that a stain is not blood, a positive reaction is by no means so conclusive in the other direction.

Latterly he has worked with phenolphthalin, and has been able with this reagent to detect blood in a 1 in 80,000,000 dilution in water. Phenolphthalin is a leuco-compound of phenolphthalein, and on oxidation is converted into this latter substance, so that when the oxidation takes place in the presence of an alkali a deep purple red colour results. It is prepared as follows: Phenolphthalein is dissolved in considerable excess of 30 per cent. sodium hydroxide solution and boiled with an excess of zinc dust until a few drops of the liquid no longer give the colour of phenolphthalein after neutralisation with hydrochloric acid, and the addition of sufficient alkali to give a slight alkaline reaction. The solution is then decanted from the zinc dust and the phenolphthalin precipitated by acidifying with hydrochloric acid, the precipitate is collected on a filter and purified by dissolving in the smallest quantity of boiling alcohol that will take it up, filtering if necessary, and precipitating by adding cold water while constantly stirring; the compound is again dissolved in alcohol and again precipitated with water, the process being

repeated three to five times, and leaving a white crystalline mass entirely free from phenolphthalein. It may be dried in air or in the oven at a temperature of 50° to 80° C., and must be kept away from metallic surfaces and from dust; if kept in the dark in closely stoppered bottles, it will keep good for a month or longer, after that it gradually becomes yellowish-pink, and gives the reaction of phenolphthalein when dissolved in an alkali.

For use two solutions are made: (1) *Alkaline phenolphthalin*, by dissolving 0·032 gramme of phenolphthalin in 21 cc. of $\frac{N}{10}$ sodium hydroxide, and making up to 100 cc. with water. The solution keeps well. (2) *Alkaline phenolphthalin containing hydrogen peroxide* has the same composition as the above with the addition of 0·1 cc. of $\frac{N}{1}$ hydrogen peroxide (or 0·1 cc. of commercial 3 per cent. hydrogen peroxide). This is added when the fluid has been brought up to nearly 100 cc., and after its addition water is added to bring the volume up to exactly 100 cc. (It is important to remember that in all the preparations the water used must be freed from copper by redistilling it in glass vessels.) It will keep for forty-eight hours in a stoppered bottle in the dark. In use, 2 cc. of the reagent are added to 1 cc. of the fluid to be tested. The alkaline phenophthalin without peroxide will detect 1 in 8,000,000 dilutions of blood in water after standing eighteen hours. The reagent containing peroxide will detect 1 in 80,000,000, after standing five minutes.

The quantity of phenolphthalin oxidised under the influence of blood is proportional to the quantity of blood present.

Applied to urine the test may fail to detect blood on account of the presence of certain restraining (reducing) substances. This difficulty is avoided by previously producing absorption and concentration of the blood pigment, 1 cc. of urine is added to 2 cc. of distilled water and 2 drops of thick alumina cream are added, the mixture is then shaken, filtered on a small filter, the residue washed in distilled water, and then added in small quantities to 2 cc. of the reagent. In this fashion the author was able to detect 1 in 1,000,000 dilution of blood in urine. Soil also may be used as an absorber in the same way, especially if the specimen is boiled with the soil.

In testing for blood in milk the secretion is first curdled with acetic acid and the reagent added to the whey which takes up practically all the blood. In gastric contents Kastle was able to detect 1 part of blood in 1,750 parts of stomach contents.

The reaction occurs even after a fluid containing blood has been boiled, and this serves to distinguish it from the reactions which may be obtained with such things as pus, saliva, malt, potato, and certain plant extracts. On the other hand, the reaction with blood is lost on incineration, which serves to distinguish it from that given by certain salts, such as sulphate of copper; a further point of distinction from the salts of the metals is that some give the reaction only with alkaline phenolphthalin without hydrogen peroxide, and others give it only in the presence of hydrogen peroxide.

The author concludes that in phenolphthalin we have an extremely delicate test for blood, and one that is reliable provided that it is properly controlled.

W. S. H.

Culture of Leishmania Donovani in a Liquid Medium.—A. Laveran and A. Petit have been occupied for several months in the study of the Tunis variety of the *Leishmania Donovani*, and have succeeded latterly in obtaining abundant cultures of this protozoon. They state (*Comptes-Rendus de la Soc. de Biol.*, January 28th, 1910, p. 114) that the secret of success lies in making use of a large area of surface. The organism thrives in the superficial layer only. Hence ordinary tubes are unsuitable, Roux's flasks of 500 cc. capacity are employed. The medium consists of sterile peptone salt fluid to which an equal volume of defribinated rabbit's blood is added. About 50 cc. are placed in each flask. In three or four days after inoculation and incubation at 22° C. small rosettes appear. Three or four days later, the flagellated forms have become so numerous as to form whitish specks visible to the unaided eye. It is essential that there should be only a shallow layer of the culture fluid at the bottom of the flask.

The latest Ehrlich-Hata Preparation for the Treatment of Syphilis. — (Reprint from *Münch. med. Wochenschr.*, No. 11, 1910). By Professor Konrad Alt. The writer is a specialist in mental and nervous diseases, and, as he states, frequently has to deal with patients whose condition is the result of syphilis. After some general remarks on the treatment of syphilis, with special reference to the use of arylarsonates, he states that arsenophenylglycin has been tried in 140 mental cases of various kinds, all of which had a history of syphilis, and that in many cases a marked improvement had resulted, while in none of them had there been any unpleasant consequences. Provided the patient's excreting organs appear to be healthy, Alt prefers to inject 0·8 gramme on two successive days, instead of a number of small doses spread over a longer period. The only disturbances produced by this intensive dosing were an increase of the pulse-rate by 10 to 15 beats per minute, mild pyrexia, and occasionally a temporary disturbance of the digestive organs, and in about 10 per cent. of the cases a scarlatiniform rash developed about seven to eight days after the second injection. Patients were kept in bed for some days before receiving the injection and were brought into a good state of health generally. Of the 121 patients treated on this plan, all of whom had a history of syphilis, and whose serum gave a positive Wassermann reaction, in twenty cases the Wassermann reaction became negative and remained permanently so, in thirteen others the reaction was considerably modified; among the twenty cases were four youthful epileptics in whose cases a distinct clinical improvement took place.

A fresh preparation which promises even better results than arsenophenylglycin has recently been introduced by Ehrlich and Bertheim. This is dioxydiamido-arsenobenzol ($C_{12}H_{12}O_2N_2As_2$), it is employed in the form of a chloride, and is supplied as a yellow powder in a vacuum capsule and is designated "606." At present a dose of 0·3 gramme is being used, this is placed in 10 cc. of sterilised water and sterilised normal solution of caustic soda added till only a trace of the substance remains undissolved; sterilised water is then added to bring the bulk of the solution up to 20 cc. Eusemin is added as an anæsthetic. Half of the solution is slowly injected deeply into each buttock, and the patient lies

down for half an hour. The injection is frequently followed by severe pain, although this generally passes off in twelve to twenty-four hours.

Alt first treated twenty-three patients, mostly suffering from some form of paralysis, each receiving a single injection containing 0·3 gramme of the substance "606." Of eighteen patients who had shown positive Wassermann reactions, in two the reaction has quite disappeared, in two it has become much modified, and in three it has been somewhat modified. The excretion of arsenic in the urine continues for ten days as against three to five in the case of atoxyl and arsacetin.

Alt and Schreiber next treated twenty-seven cases of recently acquired (florid) syphilis in the same way. The improvement in the clinical condition was astonishingly rapid even in the most obstinate cases. The cases were treated in January, 1910, and by the end of March, fourteen of them had lost the Wassermann reaction. C. E. P.

Correspondence.

SERUM DIAGNOSIS OF SYPHILIS.

TO THE EDITOR OF THE "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS."

Sir,—I think that Captain T. H. Gibbon is to be congratulated on the timely appearance of his note on Fleming's method of serum diagnosis in syphilis. I am in complete agreement with him as to the absolute necessity of carrying out some modification of the Wassermann test before a man's name is removed from the syphilis register as cured. I have been the more struck with the truth of this during a course of routine work in the Inoculation Department of St. Mary's Hospital, under Sir Almroth Wright, where recently in one week two cases of so-called cures after syphilis came under my notice. These cases were both officers who had been under the medical care of two doctors of European reputation, and had been declared by them to be free from syphilis, simply because they had undergone the usual treatment for the usual time and had been free from symptoms. To my surprise, I confess, in both cases the reaction was markedly positive. I look on the test as of extreme value, not so much on account of the aid to diagnosis that it gives, as to the definite information one obtains that the patient no longer has the antibody present. In the present state of knowledge as to the relations of antigen and antibody, we may say, that antibody absent equals a cure. It is all very well, however, to say and to lay down that a Wassermann should be done in all our registered syphilitic cases. Even if we use Fleming's modification the technique is still not easy, and requires a specialist to attend to it. There are sources of error in Fleming's method which only one who is doing the work day by day can get over. It means, therefore, that an officer must be detailed in the larger hospitals to do *nothing else* but blood work. This cannot very well be done at

present. The "blood-man" is not often left alone. He is called away, like anyone else, in the middle of his most critical experiments, to inspect meat or something like that. At present the "blood-man" is looked upon as a bit of a crank. The surgical man would not be dealt with like that. We look upon him with a certain amount of awe and respect. So I am afraid that it is early times yet before a Wassermann can be done on all our syphilitics. Still, the time will come when the immunisator will come into his kingdom, and when the "blood-man" will get the respect for his work that is his due.

Captain Gibbon's account of the technique is very clear, but after an experience of many hundreds of tests carried out by Fleming's method, I am prompted *not* to recommend anyone to follow the pipette method. My experience teaches me that the mixing is best done in small test-tubes of glass tubing of small bore about half an inch long. I arrange my test-tubes in a double row stuck up in plasticine (a sticky material which was first used for this purpose by Dr. Martley, of St. Mary's Hospital). I have two measured pipettes of 10 cmm. and 40 cmm. capacity. Diagrammatically, the mixtures are made thus:—

Plasticine block.

A	Glass tubule, O containing:— 40 cmm. salt. 10 ,, serum.	Glass tubule, O containing:— 40 cmm. antigen (diluted 1 in 20). 10 cmm. normal serum (non-syphilitic).
	After one hour incubation add to both sides— 10 cmm. of sheep's corpuscles (5 per cent. suspension in 1 per cent. saline).	
B	O 40 cmm. salt. 10 cmm. of patient's serum.	O 40 cmm. diluted antigen. 10 cmm. of patient's serum (? syphilitic).
	After one hour incubation add to both sides— 10 cmm. of sheep's corpuscles (5 per cent.).	
C	O 40 cmm. salt. 10 cmm. sheep's corpuscles, 5 per cent.	O 40 cmm. antigen. 10 cmm. sheep's corpuscles, 5 per cent.

Assuming that the normal serum A contains hæmolytic amboceptor and complement, you will get hæmolysis on both sides. In B you will get hæmolysis in the salt, but not on the antigen side, if the patient is still suffering from syphilis, that is, if the specific amboceptor is still present in the serum. C is simply a check on the antigen and the salt. Any number of sera can be put up against the normal without giving much extra trouble.

By having the mixtures in these minute test-tubes, it seems to me you get a better view of what is going on, and can more easily measure the degree of hæmolysis by the colorimetric test, as suggested by Professor Muir.

Work on the deviation of alexin can be carried out in a similar manner and with the same technique. The method of deviation can be applied to such diseases as gonorrhœa, typhoid, &c., and we should be able to say whether the patient is clear of infection. But it is one man's work, and must almost be his life work.

I am, &c.,

Tregantle. D. S. Skelton,

Captain R.A.M.C.

THE SOLDIER'S VISION.

TO THE EDITOR OF THE "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS."

Dear Sir,—In the March number of the Journal, Major D. T. Collins, in the course of an article entitled "The Soldier's Vision," advocates a higher standard of vision in the case of men enlisting for the cavalry, infantry, or gunners of the Royal Artillery. He lays down as an axiom that men who cannot see $\frac{6}{6}$ on Snellen's types with or without glasses, and all men with astigmatism, should be rejected for the shooting corps, and he proposes that, after undergoing a second visual test at the Depôt and failing to come up to this standard, they should be recommended for transfer to other arms of the Service.

This proposed innovation would be a great improvement on the present procedure, and would save endless trouble and correspondence in connection with men who, having passed the low standard of vision required by regulation, have joined one of the shooting corps and have been found at a later stage to be quite unfitted for the duties of shooting, signalling, range finding, &c. I should be inclined, however, to go one better than Major Collins, and would advocate raising the standard of vision for men enlisting into the above corps. At present the standard is too inelastic, being the same for practically all branches of the Service. Other standards, such as height and chest girth, vary according to the corps in which a man enlists, and there appears to be no valid reason why the visual standard should not be varied in a similar manner. A man whose chief duties will consist of shooting, signalling and scouting

should, in my opinion, be required to pass a more severe test of visual acuity than would be required for non-shooting corps. I would therefore advocate the raising of the standard of the shooting corps to $\frac{6}{12}$ (Snellen) or even as high as $\frac{6}{9}$ if sufficient numbers could be obtained, the regulations relating to cases of anisometropia remaining unchanged, and the standard for other arms of the Service remaining as before. If, in such large armies as the French and German, $\frac{6}{12}$ has been adopted as a universal standard, surely in a small army such as ours this standard could safely be adopted for a part, without any great effect on the number of rejections for the Army as a whole.

Major Collins' proposed plan of ordering glasses for men with errors of refraction would work well in peace times, but I am afraid there would be many difficulties on active service; men would break their glasses either accidentally or on purpose, and they could not be readily replaced.

If the standard was raised for the above-mentioned corps as I have suggested, it would have the effect of largely reducing the number of men compelled to wear glasses, and would, I think, make for increased efficiency in these corps.

Cook's Hill,
Mundesley, Norfolk,
April 24th, 1910.

I am, &c.,
C. E. FLEMING,
Captain R.A.M.C.

THE ROYAL ARMY MEDICAL CORPS MESS, LONDON.

TO THE EDITOR OF THE "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS."

SIR,—Being in England on short leave from India, and not having seen the Royal Army Medical Corps College since it was opened, I seized an early opportunity of visiting there, and was most kindly shown over it by the Commandant.

One cannot fail to be struck by the splendid arrangements made for instruction and research in those lines which especially concern the sphere of work of Army medical officers, but what has urged me to address you now is another aspect—the relation of the Corps to its College. Here is a mess of which any corps may be more than proud, housed in magnificent quarters. I cannot attempt to describe the place in a short letter, the object of which is to draw attention to the fact that this mess, in which every Royal Army Medical Corps officer must reside at least twice in his career, and of which every Royal Army Medical Corps officer is an honorary member, appears to have no funds for its maintenance beyond those obtained from officers on the staff of the College and those under instruction. Therefore the source of supply must be fluctuating and uncertain. The staff would be much the same always, but the numbers under instruction must be a variable quantity, at times falling very low (as at present), and even to a vanishing point in

time of a war of moderate magnitude. At such a time the funds available for maintenance would have to be provided by a few officers, to whom the burden would become so onerous that the certain result would be the closing of the mess. It is not necessary to dilate upon the unfortunate effect such closing, or even any curtailment of its amenities, would entail; or to do more than refer to the value accruing to our Corps of possessing such an institution as this within the Metropolis, maintained permanently at its present high standard of excellence, to raise the question, "What is our duty as a Corps towards the Royal Army Medical Corps College"

As a result of this visit my own feeling is that I ought to contribute towards the College Mess Fund, and I am desirous of giving material effect to this feeling at once. I am convinced that every Royal Army Medical Corps officer who realises the conditions of this mess will have a similar desire. This can be brought about if the position can be made fully known to the Corps, and where more appropriately than at the next General Meeting of the Royal Army Medical Corps Fund? On that occasion discussion may lead to a full understanding of the financial resources, and to a resolution setting forth the manner in which the members of the Corps are prepared to associate themselves with this magnificent institution.

I am, &c.,
B. SKINNER,
Lieutenant-Colonel, R.A.M.C.

Wimbledon,
May 21st, 1910.

LOUISE MARGARET HOSPITAL, ALDERSHOT.

TO THE EDITOR OF THE "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS."

SIR,—After an absence abroad of nearly six years, I returned last week, and while staying a few days with some friends at Aldershot, I ran up one morning to have a look at the Louise Margaret Hospital, which I had charge of when it was first started in 1898.

I went round with Major Green, the officer in charge, accompanied by Miss Beesby, the Matron. I was delighted with the great improvements which have been made and the apparently unstinted expenditure which has been allowed and which has placed this Hospital on a level with any other of its kind in the Kingdom, and far ahead of the majority.

The Hospital has been adequately described in our Journal for March last, and the scope of its work indicated, but the points that struck me most were: (1) The new operating room; (2) the maternity wards (3) the home or quarters for the nursing staff and for those nurses who are studying for a maternity diploma.

The operating room is completely equipped and quite up to date in every way; the lighting is ahead of all hospital operating rooms I have

seen. This is done by electricity, and the lights are arranged all round the room at the junction of the walls and ceiling, in the same manner as is seen in some jewellers' shops, and, I believe, in some racquet courts; this arrangement practically abolishes any shadow which might interfere with perfect illumination of every part to be operated on. The lamps are in an elongated form and practically continuous all round the room. Major Green is to be congratulated on the happy thought which resulted in the putting up of these lights.

The confinement wards are perfect in every way, each being fitted with all requirements, tables, &c., being of the best aseptic make.

The quarters for the nurses were shown by the Matron, Miss Beesby; they are situated in a detached building, where each nurse has a separate and well-furnished room for herself. There is a large dining-room and drawing-room (with piano), a good-sized box-room and ample bath accommodation, and last, but not least, a large (and well-stocked) store-room, and a bright, clean, well-ventilated kitchen. It reflects the greatest credit on the Matron, who must have expended much time and thought to bring her department to such a state of perfection. She informs me that she has no vacancy for a nurse before May, 1910, and as each applicant must be a trained nurse it speaks volumes for the popularity of the Hospital as a training institution.

I have been greatly pleased to see my old Hospital in such a state of perfection, and it is now well worth a visit by any medical man in or out of the Service.

I am, &c.,
W. WATSON PIKE,
Lieutenant-Colonel R.A.M.C.

Tidworth,
April 13th, 1910.

INDEX TO VOLUME XIV.

Distribution List of

SURGEON-GENERALS AND COLONELS

REMOVED FROM THE CORPS AND STILL
ON THE ACTIVE LIST,

OFFICERS OF THE ROYAL ARMY MEDICAL CORPS

AND

RE-EMPLOYED RETIRED OFFICERS.

JANUARY, 1910.

[This List is prepared according to the latest information contained in Official Returns. Officers are requested to register any Diplomas or special qualifications at Headquarters, War Office, in order that this list may be published as complete as possible.]

SPECIALIST CERTIFICATES IN:

a = State Medicine (R.A.M. College qualification).
b = Diploma in Public Health.
c = Bacteriology.
d = Dental Surgery.
e = Dermatology and Venereal Diseases.
f = Specific Fevers.
g = Laryngology.
h = Midwifery and Gynæcology.
j = Operative Surgery.
k = Ophthalmology.
l = Otology.
m = Pædiatrics.
n = Psychological Medicine.
o = Skiagraphy.
p = Diploma in Tropical Medicine.

ARMY MEDICAL SERVICE.

HEADQUARTER STAFF.

Rank.	Name.	Appointment.
Surgeon-General ..	Keogh, Sir A., K.C.B., M.D., K.H.P.	Director-General of Army Med. Services.
,, ,, ..	Gubbins, W. L., C.B., M.V.O., M.B., K.H.S.	Deputy Director-General.
Lieutenant-Colonel .	Irwin, J. M., M.B.	Assistant Director-General.
,, ,, ..	Eckersley, E., M.B.	Deputy Assistant Director-General.
Major	Birrell, E. T. F., M.B.	,, ,, ,, ,,
,, ...	Buist, H. J. M., D.S.O., M.B. ..	,, ,, ,, ,,
,, ...	Pollock, C. E.	,, ,, ,, ,, (attached to the Department of the Director of Military Operations).

ARMY MEDICAL SERVICE ADVISORY BOARD.

Rank.	Name.	Appointment.
Colonel	Bruce, Sir D., Knt., C.B., F.R.S., M.B.	Expert in Tropical Diseases.
Major	Horrocks, W. H., M.B.	Expert in Sanitation.

ROYAL ARMY MEDICAL COLLEGE.

Rank.	Name.	Appointment.
Colonel	Wardrop, D., C.V.O., M.B. ..	Commandant and Director of Studies.
Major	Spencer, C. G., M.B., F.R.C.S. Eng.	Professor of Military Surgery.
,, ...	Harrison, W. S., M.B.	,, Tropical Medicine.
Lieutenant-Colonel .	Melville, C. H., M.B.	,, Hygiene.
Major (Brevet-Lieutenant-Colonel)	Leishman, Sir W. B., Knt., M.B.	,, Pathology.
Major	Wanhill, C. F.	Assistant Professor of Hygiene.
Captain	Kennedy, J. C., M.D.	,, ,, Pathology.
Lt.-Colonel (Bt.-Col.)	Lambkin, F. J.	Lecturer in Syphilology.

SURGEON-GENERALS.

Name.	Station.	Appointment.
Bourke, G. D., C.B., K.H.P.	Dublin	Principal Med. Officer, Irish Command.
Dorman, J. C., C.M.G., M.B.	London	,, ,, ,, Eastern Command.
Ellis, P. M.	Lucknow, India ..	,, ,, ,, 8th (Lucknow) Div.
Gallwey, Sir T. J., K.C.M.G., C.B., M.D.	Aldershot	,, ,, ,, Aldershot Command.
Gubbins, W. L., C.B., M.V.O., M.B., K.H.S.	War Office, London ..	Headquarter Staff.
Kenny, W. W., M.B., F.R.C.S.I.	Returning to England.	
Lloyd, O. E. P., V.C. ..	Proceeding to South Africa.	
Sloggett, A. T., C.M.G. ..	Poona, India	Principal Med. Officer, 6th (Poona) Division.
Trevor, F. W., C.B., M.B.	Simla, India	,, ,, ,, His Majesty's Forces in India.
Whitehead, H. R., C.B., F.R.C.S.Eng.	Salisbury	,, ,, ,, Southern Command.

COLONELS.

Name.	Station.	Appointment.	Specialist Certificates in
Anderson, L. E.	Allahabad, India	Prin. Med. Officer, Allahabad and Fyzabad Brigades	—
Barrow, H. J. W... ..	Lahore Cantonment, India	Prin. Med. Offi., 3rd (Lahore) Div.	—
Babtie, W., V.C., C.M.G., M.B.	London	Inspector of Medical Services ..	—
Bedford, W. G. A., C.M.G., M.B.	Hong Kong	Prin. Med. Officer, South China	—
Bruce, Sir D., Knt., C.B., F.R.S., M.B.	Uganda	Sleeping Sickness Commission ..	—
Butt, E., F.R.C.S.I. ..	Calcutta, India	P.M.O. Presidency and Assam Brigades	—
Corker, T. M., M.D. ..	Egypt	Principal Medical Officer.. ..	—
Croly, A. E. J., F.R.C.S.I.	Dover	Administrative Medical Officer ..	—
Dodd, J. R., M.B., F.R.C.S.Eng.	Cork	,, ,, ,, ..	b.
Forman, R. H., M.B. ..	Bombay, India	Principal Medical Officer, Bombay Brigade	—
Ford, R. W., D.S.O. ..	Tidworth	Administrative Medical Officer ..	—
Goggin, G. T.	Chester	Prin. Med. Offi., Western Com...	—
Hathaway, H. G... ..	Portsmouth	Administrative Medical Officer ..	—
Jones, J. M.	Returning to England ..	.. ..	—
Jennings, R., M.D. ..	Devonport	Administrative Medical Officer ..	—
Kerin, M. W.	Bareilly, India	Prin. Med. Officer, Bareilly and Gharwal Brigades	—
MacNeece, J. G.	Malta	Principal Medical Officer ..	—
MacNeece, T. F. ..	Chatham	Administrative Medical Officer ..	—
Maclean, F. B.	Lucknow, India	Offg. Prin. Med. Officer, 8th Div.	—
Murray, H. W., M.B. ..	Gibraltar	Principal Medical Officer.. ..	—
Moberley, H. J. R. ..	Bangalore, India	P.M.O., Bangalore and Southern Brigades	—
North, E., F.R.C.S.Edin.	Dublin	Administrative Medical Officer	—
O'Connor, A. P., C.B., F.R.C.S.I.	Colchester	,, ,, ,, ..	—
O'Sullivan, D., F.R.C.S.I.	Quetta, India	Prin. Med. Officer, 4th Division ..	—
Peterkin, A., M.B. ..	London	Principal Medical Officer, London District	—
Robinson, G. W.	Cape Town, South Africa	Admin. Med. Officer, C.C. and O.R.C.	—
Robinson, S. C. B. ..	Jubbulpore, India ..	Prin. Med. Officer, Jubbulpore and Jhansi Brigades	—
Wardrop, D., C.V.O., M.B.	R.A.M. College	Com. and Director of Studies ..	—
Woodhouse, T. P. ..	Edinburgh..	Prin. Med. Officer, Scottish Com.	—

LIEUTENANT-COLONELS.

(Under Article 365 of the Royal Warrant.)

Baker, W. J.	Cairo, Egypt	Officer in charge Military Hospital, and Officer Commanding 33rd Coy. R.A.M.C.	—
Battersby, J., M.B., F.R.C.S.I.	Secunderabad, India ..	.. ..	—
Birrell, W. G., M.B. ..	Mauritius	Senior Medical Officer	—
Barratt, H. J.	Fort Canning, St. Setts.	,, ,, ,, ...	b.
Burton, F. H. M., M.D.	Hounslow	Officer in charge Military Hospital	—
Bond, R. P.	Chatham	,, ,, ,, ,,	—
Culling, J. C.	Prospect, Bermuda ..	Senior Med. Officer and Officer in charge Mil. Hosp. and Officer Command. 25th Coy. R.A.M.C.	—

Name.	Station.	Appointment.	Specialist Certificates in
Dick, W., M.B., F.R.C.S. Edin.	Woolwich	Admin. Med. Officer and Officer in charge Royal Herbert Hosp.	b.
Firth, R. H., F.R.C.S. Eng. (Brevet-Colonel)	Aldershot	In charge School of Army Sanitation and Instructor R.A.M.C. School of Instruction	b.
Faunce, C. E.	Gibraltar	Officer in charge Military Hospital	—
Geddes, R.J., D.S.O., M.B.	Jubbulpore, India ..	,, ,, ,, ,,	b.
Heffernan, W.	Pembroke Dock	Officer in charge Military Hospital	—
Hackett, R. I. D., M.D...	South Africa	.. ..	—
Hamilton, T. W. O. H., C.M.G., M.B.	Aldershot	Staff Officer to P.M.O.	—
Irwin, J. M., M.B. ..	War Office, London ..	Headquarter Staff	—
Johnston, H. H. C.B., M.D.	Curragh	Officer in charge Military Hospital and Officer Commanding 17th Coy. R.A.M.C.	b.
Jencken, F. J., M.B. ..	Netley	Officer in charge Royal Victoria Hospital	b.
Kirkpatrick, R., C.M.G., M.D.	Devonport	Officer in charge Military Hospital and O.C. 7th Coy. R.A.M.C.	—
Lucas, T. J. R., C.B., M.B.	Bangalore, India	.. ..	—
Lambkin, F. J. (Bt.-Col.)	Rochester Row, London..	Officer in charge Military Hospital	—
Lynden Bell, E.H.L., M.B.	Meerut, India	,, ,, ,, ,,	—
Macpherson, W.G., C.M.G., M.B.	War Office, London ..	.. ..	b.
Morse, R. E. R.	Cosham	Officer in charge Military Hospital and Officer Commanding 6th Coy. R.A.M.C.	
Moore, R. R. H., M.D. ..	Netley	Officer in charge Medical Division	—
McGill, H. S.	Poona, India	Officer in charge Military Hospital	b. p.
Noding, T. E.	Cork..	Officer in charge Military Hospital and Officer Commanding 16th Coy. R.A.M.C.	—
Nichols, F. P., M.B. ..	Returning to England, tour expired	.. ..	—
Nichol, C.E., D.S.O., M.B.	India	.. ..	—
O'Keefe, M. W., M.D. ..	Rawalpindi, India ..	Officer in charge Military Hospital	—
O'Donnell, T. J., D.S.O...	Quetta, India	,, ,, ,, ,,	—
O'Connell, D. V., M.D. ..	Shorncliffe	,, ,, ,, ,,	b.
Porter, R., M.B.	Belfast	Administrative Medical Officer ..	—
Pike, W. W., D.S.O., F.R.C.S.I.	Darjeeling, India	Officer in charge Military Hospital	—
Rhodes, J. H. A.	Tralee	,, ,, ,, ,,	—
Risk, E. J. E.	Bloemfontein	Officer in charge Military Hospital and O.C. 24th Coy. R.A.M.C.	—
Reade, W. L.	Dublin	Officer in charge Royal Infirmary and Officer Commanding 14th Coy. R.A.M.C.	—
Reid, J. M., M.D. ..	Returning to England, tour expired	.. ..	—
Russell, A. F., C.M.G., M.B.	Cottonera, Malta	Officer in charge Military Hospital and O.C. 30th Coy. R.A.M.C.	—
Sawyer, R. H. S., M.B., F.R.C.S.I.	London	Officer in charge Queen Alexandra Military Hospital	—
Skinner, B. M., M.V.O. ..	Peshawar, India	Officer in charge Military Hospital	—
Simpson, R. J. S., C.M.G., M.B.	London	.. ..	—
Townsend, S., M.D. ..	Dover	Officer in charge Military Hospital	—
Treherne, F. H., F.R.C.S. Edin.	Aldershot	Offi. in charge Cambridge Hospital	b.
Trevor, H. O.	Jamaica	Senior Medical Officer and Officer Commanding R.A.M.C.	—
Tyrrell, C. R.	Bordon	Administrative Medical Officer ..	—
Thomson, W. B.	Calcutta, India	Officer in charge Military Hospital	—
Tate, A. E.	Ambala, India	,, ,, ,, ,,	—
Westcott, S., C.M.G. ..	Mhow, India	,, ,, ,, ,,	b.
Winter, T. B.	Bareilly, India	,, ,, ,, ,,	b.

LIEUTENANT-COLONELS.

Name.	Station.	Appointment.	Specialist Certificates in
Adams, G. G.	Proceeding to India ..	.. ..	—
Allen, S. G.	London	Recruiting duties	b.
Adamson, H. M., M.B. ..	York	.. ..	—
Aldridge, A. R., M.B. ..	Returning to England, tour expired	.. ..	b.
Austin, H. W.	Glasgow	Officer in charge Military Hospital	—
Brazier-Creagh, G. W., C.M.G.	Lichfield	,, ,, ,, ,,	—
Braddell, M. O'D., M.B.	Lahore, India	,, ,, ,, ,,	—
Beevor, W. C., M.B., C.M.G.	Dalhousie, India	,, ,, ,, ,,	—
Birt, C.	London	.. ..	—
Berryman, W. E... ..	Delhi, India	Officer in charge Military Hospital	—
Blackwell, C. T., M.D. ..	Eastern Command ..	.. ..	b.
Buchanan, J. B. W., M.B.	Londonderry	Officer in charge Military Hospital	—
Brown, H. H., M.B. ..	Nowshera, India	,, ,, ,, ,,	—
Burtchaell, C. H., M.B...	Dublin	Staff Officer to Principal Medical Officer, Irish Command	b.
Barefoot, G. H.	Bareilly, India	Officer in charge Military Hospital	—
Bate, A. L. F.	Rawalpindi, India ..	,, ,, No. 2 Sect. Hosp.	—
Caldwell, R., F.R.C.S.Eng.	Proceeding to S. Africa ..	.. ..	b.
Cree, G.	Madras, India	Officer in charge Military Hospital and in charge His Excy. The Governor's Body Guard	—
Curtis, J. H.	Ballincollig	Officer in charge Military Hospital	—
Carr, H., M.D.	Proceeding to India ..	.. ..	—
Cree, H. E.	Proceeding to India ..	.. ..	—
Cocks, H., M.B.	Wellington, India.. ..	Officer in charge Military Hospital	—
Clarkson, T. H. F. ..	Tower of London.. ..	,, ,, ,, ,,	—
Cottell, R. J. C.	Royal Hospital, Chelsea..	Physician and Surgeon	h.
Dodd, A.	Chester	Officer in charge Military Hospital	—
Donnet, J. J. C.	Belfast	Officer in charge Military Hospital and Officer Commanding 15th Coy. R.A.M.C.	—
Duncan, S. E.	Proceeding to S. Africa ..	.. ..	—
Day, W. B., M.B. ..	Shrewsbury	Officer in charge Military Hospital	—
Daly, J. H.	Tipperary	,, ,, ,, ,,	—
Daly, T.	Ferozepore, India ..	,, ,, ,, ,,	—
Davidson, J. S., M.B. ..	Allahabad, India	,, ,, ,, ,,	—
Donegan, J. F.	Parkhurst	,, ,, ,, ,,	—
Donaldson, J.	Aldershot	,, ,, Isolation Hosp.	—
Elkington, H. P. G. ..	Returning to England, tour expired	.. ..	b.
Eckersley, E., M.B. ..	War Office, London ..	Headquarter Staff	b.
Forrest, J. R.	Ireland	Sick leave	b.
Fletcher, H. J., M.B. ..	Sialkot, India	Officer in charge Military Hospital	—
Ferguson, N. C., C.M.G., M.B.	Millbank, London ..	Assistant to Officer in charge Military Hospital	b.
Fallon, J.	Preston	Officer in charge Military Hospital	—
Fayrer, Sir J., Bt., M.D., F.R.C.S.Edin.	Hong Kong	,, ,, ,, ,,	—
Gubbin, G. F.	Colaba, India	,, ,, ,, ,,	—
Green, J. S., M.B. ..	Nasirabad, India ..	,, ,, ,, ,,	—
Gordon, P. C. H... ..	Rangoon, India	,, ,, ,, ,,	b.
Gordon-Hall, F. W. G., M.B.	Returning to England, tour expired	.. ..	—
Gerrard, J. J., M.B. ..	York	Medical Inspector of Recruits, Northern Command	—
Houston, F. S., C.M.G., F.R.C.S.I.	Edinburgh..	Officer in charge Military Hospital and O.C. 13th Coy. R.A.M.C.	—
Hunter, G. D., D.S.O. ..	Aldershot	Offi. Com. Depôt, R.A.M.C., Offi. in charge Records, R.A.M.C., and School of Instruction, R.A.M.C.	—

Name.	Station.	Appointment.	Specialist Certificates in
Henderson, R. S. F., M.B.	Simla, India	Sec. to P.M.O., H.M.'s Forces in India	—
Haines, H. A., M.D. ..	Returning to England, tour expired	.. ..	—
Hale, G. E., D.S.O. ..	London	Medical Inspector of Recruits, Eastern Command	—
Hickson, S., M.B. ..	Wynberg, S. Africa ..	Officer in charge Military Hosp. and O.C. 22nd Coy. R.A.M.C.	—
Hearn, M. L.	Dublin	Medical Inspector of Recruits ..	—
Hall, R. H., M.D. ..	Colchester	.. ..	—
Hanley, R. G., M.B. ..	Dublin	Officer in charge Military Hospital, Portobello	—
Hennessy, D., M.D. ..	Ahmednagar, India ..	Officer in charge Military Hospital	—
Holyoake, R.	Sheerness	,, ,, ,, ,,	—
Johnson, C. W., M.B. ..	Gibraltar	.. ..	—
Jones, F. W. C., M.B. ..	Colchester	Officer in charge Military Hospital	—
Josling, C. L.	London	Recruiting, London District ..	—
Kennedy, A.	Netley	Officer in charge Convalescent Div.	—
Knaggs, H. T., M.D. ..	Alexandria, Egypt ..	Officer in charge Military Hospital	b.
Lilly, A. T. I.	Belgaum, India	,, ,, ,, ,,	—
Lane, C. A., M.B. ..	Tidworth	Officer in charge Military Hospital and O.C. 20th Coy. R.A.M.C.	—
Lavie, T. G.	Newbridge	Officer in charge Military Hospital	—
Le Quesne, F. S., V.C. ..	Eastern Command ..	.. ..	—
McCreery, B. T., M.B., F.R.C.S.I.	Agra, India	Leave	b.
Magrath, C. W. S., M.D.	Hilsea	Officer in charge Military Hospital	—
Morris, W. A.	Cawnpore, India.. ..	,, ,, ,, ,,	—
Maher, J.	Potchefstroom, S. Africa	,, ,, ,, ,,	—
Manders, N.	Colombo, Ceylon ..	O.C. 26th Coy. R.A.M.C., and Officer in charge Military Hosp.	—
Meek, J., M.D.	Poona, India	.. ..	b.
Morris, A. E., M.D. ..	Kamptee, India	Officer in charge Military Hospital	—
Macleod, R. L. R., M.B.	Karachi, India	,, ,, ,, ,,	b.
Melville, C. H., M.B. ..	R.A.M. College	Professor of Hygiene	b.
MacDonald, C. J., M.D...	Fermoy	Officer in charge Military Hospital and Anæsthetist	—
Mathias, H. B., D.S.O. .. (Colonel in Egypt)	Egypt	Principal Med. Officer Egyptian Army	—
Marks, G. F. H., M.D. ..	Proceeding to India ..	.. ..	—
Nash, L. T. M.	Ranikhet, India	Officer in charge Military Hospital	—
Newland, F. R., M.B. ..	York	Staff Officer to P.M.O., Northern Command	—
O'Halloran, M., M.D. ..	Woolwich	Officer in charge Auxiliary Hosp. and Garrison Sanitary Officer	—
O'Donnell, J. J., M.B. ..	Kirkee, India	Officer in charge Military Hospital	—
O'Callaghan, D. M. ..	Returning to England, tour expired	.. ..	—
Powell, S., M.D. ..	Maymyo, India	Temp. Offi. in charge Mil. Hosp.,	—
Philson, S. C.	India	.. ..	—
Penton, R. H., D.S.O. ..	Proceeding to India ..	.. ..	b.
Russell, M. W.	London	Staff-Officer to P.M.O., Eastern Command	—
Reilly, C. C.	Sandhurst	Surgeon R.M. College	—
Rowan, H. D., M.B. ..	Murree, India	Officer in charge Military Hospital	—
Russell, J. J., M.B. ..	Limerick	,, ,, ,, ,,	—
Swabey, L. W.	Aden	.. ..	—
Stuart, J. R., M.B. ..	Pachmarhi, India ..	Officer in charge Military Hospital	—
Sloggett, H. M.	Aldershot	,, ,, Connaught Hosp.	—
Swan, W. T., M.B. ..	Returning to England, tour expired	.. ..	—
Shine, J. M. F., M.D. ..	Naini Tal, India	Officer in charge Military Hospital	—
Sparkes, C. S.	Deepcut and Blackdown..	,, ,, Detention Hosp.	—

Name.	Station.	Appointment.	Specialist Certificates in
Sexton, M. J., M.D.	Dublin	Officer in charge Military Hospital, Arbor Hill	—
Starr, W. H.	Shwebo, India	Officer in charge Military Hospital	—
Sutton, A. A., D.S.O.	Woolwich	,, ,, Medical Division, Royal Herbert Hospital.	—
Salvage, J. V., M.D.	India	.. ..	b.
Saunders, D. M., M.D.	Dublin	Sanitary Officer, Dublin District	b.
Thompson, H. N., D.S.O., M.B.	Lucknow, India	Officer in charge Military Hospital	—
Turner, W.	York	Offi. in charge Mil. Hosp. and Offi. Com. 8th Coy. R.A.M.C.	—
White, H. L. E.	Forrest, Malta	Officer in charge Military Hospital	—
Wilson, G., M.B.	Multan, India	,, ,, ,, ,,	-
Wills, S. R.	India	.. ..	—
Wilson, J. B., M.D.	Woolwich	Officer in charge Surgical Div., Roy. Herbert Hosp.	—
Will, J., M.B.	Kinsale	Officer in charge Military Hospital	—
Wright, R. W.	Woolwich	Sen. Med. Offi., Royal Arsenal	—
Windle, R. J., M.B.	Royal Hospital, Kilmainham, Dublin	Physician and Surgeon	—
Whaite, T. Du B., M.B.	Canterbury	Officer in charge Military Hospital	—
Yourdi, J. R., M.B.	Fort Regent, Jersey	Offi. in charge Mil. Hosp.& S.M.O.	—
Yarr, M. T., F.R.C.S.I.	Edinburgh	.. ..	k.

MAJORS.

Name.	Station.	Appointment.	Specialist Certificates in
Austin, J. H. E.	London	Recruiting duties	—
Anderson, E. C., D.S.O.	Rawalpindi, India	.. ..	—
Alexander, J. D., M.B.	Proceeding to India	.. ..	—
Austin, R. F. E.	Proceeding to India	.. ..	—
Anderson, J. B.	Benares, India	Officer in charge Military Hospital	c.
Archer, S. A.	Jullundur, India	Temp. Offi. in charge Mil. Hosp.	k.
Addams-Williams, L.	Tidworth	Company Officer	—
Burnside, E. A.	Mount Abu, India	Officer in charge Military Hospital, Lawrence School and Residency Surgeon	—
Browne, E. G.	Dublin	.. ..	b.
Bullen, J. W., M.D.	Madras, India	Offi. in charge Brigade Laboratory and Specialist in Prevention of Disease	b.
Blenkinsop, A. P.	R.A.M. College, London	Asst. to Commandant	—
Beach, T. B.	Woolwich	Royal Arsenal	—
Bewley, A. W.	Agra, India	Temp. Offi. in charge Mil. Hosp.	—
Beveridge, W. W. O., D.S.O., M.B.	London	Medical Officer, Royal Army Clothing Department	b.
Bray, G. A. T.	Southampton	Embarking Medical Officer	—
Buist, H. J. M., D.S.O., M.B.	War Office, London	Headquarter Staff	—
Brogden, J. E.	Gibraltar	Company Officer	—
Begbie, F. W.	Colchester	.. ..	—
Beyts, W. G.	St. John's Wood	Officer in charge Military Hospital	—
Buchanan, G. J., M.B.	Bareilly, India	.. ..	—
Bray, H. A.	Woolwich	With Special Reserve	—
Buswell, F. R.	London	Recruiting Duties	—
Berryman, H. A.	Chester	.. ..	o.
Barnett, K. B., M.B., F.R.C.S.I.	Shorncliffe	.. ..	m.
Boyle, M., M.B.	Northern Command	.. ..	o.
Buist, John M., M.B.	Wynberg, S. Africa	Sanitary Officer, Cape Colony and O.R.C.	b.c.p.

Name.	Station.	Appointment.	Specialist Certificates in
Blackham, R. J.	Cherat, India	San. Offi., 1st Peshawar Division	b. h.
Birrell, E. T. F., M.D. ..	War Office, London ..	Headquarter Staff	k.
Bliss, E. W.	Mhow, India	Specialist in Operative Surgery ..	j.
Brodribb, E.	Hythe	Officer in charge Military Hospital	k.
Bowen, A. W. N... ..	Elizabeth Castle, Jersey	,, ,, ,, ,,	—
Brown-Mason, H. O. B...	India	.. ..	e.
Bourke, E. A.	Bloemfontein, S. Africa..	Officer in charge Families' Hosp.	b. f.
Clark, S. F., M.B. ..	Maritzburg, South Africa	.. ..	b.
Copeland, R. J., M.B. ..	Meerut, India	Off. Staff Offi., Medical Mobilisation Store, 7th Division	—
Connor, J. C., M.B. ..	Bangalore, India	Officer in charge Military Hospital	—
Crawford, G. S.	Malta	Sanitary Officer	b. p.
Condon, E. H., M.B. ..	Cardiff	Officer in charge Military Hospital	—
Chambers, A. J.	Proceeding to S. Africa ..	.. ..	—
Collins, D. J., M.B. ..	Wynberg, S. Africa ..	Company Officer and Anæsthetist	k. b.
Clark, E. S., M.B. ..	Ireland	.. ..	f.
Cameron, K. M., M.B. ..	Simla, India	Staff Surgeon in charge Army Headquarters Staff and Establishments	j.
Carter, J. E., M.B. ..	Pretoria, S. Africa ..	Officer in charge Military Hospital, Roberts Heights, and O.C. 23rd Coy. R.A.M.C.	f. b.
Campbell, J. H., D.S.O.	Curepipe, Mauritius ..	Officer in charge Mil. Families' Hospital	h.
Cochrane, E. W. W., M.B.	Aldershot	.. ..	b. c.
Clements, R. W., M.B. ..	Wellington, India ..	Sanitary Officer, 9th Division ..	o. b. p.
Corkery, M. P.	Mount Abu, India ..	Officer in charge Military Hospital and in Medical charge, Lawrence School, and Residency Surgeon	a.
Clarke, T. H. M., C.M.G., D.S.O., M.B.	Salisbury	Medical Inspector of Recruits, Southern Command	—
Cummins, S. L., M.B. ..	R.A.M. College	.. ..	c. p.
Carroll, F. F., M.B. ..	Woolwich	.. ..	j.
Carter, G. B., M.B. ..	St. Thomas' Mount, India	Officer in charge Military and Cantonment Hospitals	—
Dalton, C.	Aden	Officer in charge Military Hospital	—
Dunn, H. N., M.B. ..	Multan, India	.. ..	—
Dansey-Browning, G. ..	Aldershot	Assistant Sanitary Officer ..	b. p.
Elliott, C. R., M.D. ..	Lahore Cantonment, India	Sanitary Officer, 3rd Division ..	b.
Erskine, W. D., M.B. ..	Returning to England, tour expired	.. ..	—
Evans, P., M.B.	Devonport	Specialist in Operative Surgery ..	b. f. j.
Forde, B., M.B.	Bloemfontein, S. Africa ..	Company Officer	b.
Ferguson, J. D., D.S.O...	Aldershot	.. ..	—
Faichnie, N., M.B. ..	Mhow, India	Divisional Sanitary Officer ..	b. p.
Fleming, C. C., D.S.O., M.B.	Aldershot	Instructor R.A.M.C. School of Instruction	—
Faichnie, F. G.	London	Officer in charge Chelsea Barracks	—
Fowler, C. E. P., F.R.C.S. Eng.	Gibraltar	Sanitary Officer	k. b.
French, H. C.	Imtarfa, Malta	Officer in charge Military Hospital	e.b.
Fleury, C. M.	Tidworth	.. ..	o.
Fox, A. C...	Tientsin, N. China ..	Senior Medical Officer and O.C. R.A.M.C.	h.
Fairrie, S. H., M.B. ..	Shorncliffe	Officer in charge Military Families' Hospital	h.
Forrest, J. V., M.B. ..	Cairo	Company Officer	—
Gray, W. L., M.B. ..	Winchester	Officer in charge Military Hospital	b.
Girvin, J.	Colaba, India	Embarkation Med. Offi., Bombay	—
Graham, W. A. S. J. ..	Nowgong, India	Officer in charge Military Hospital	—
Gibbard, T. W., M.B. ..	Dagshai, India	Officer in charge Military Hospital and in charge Cant. Hosp.	k.
Goodwin, T. H. J. C., D.S.O.	Quetta, India	Specialist in Operative Surgery ..	j. o.

Name.	Station.	Appointment.	Specialist Certificates in
Green, S. F. St. D., M.B.	Aldershot	Officer in charge Louise Margaret Hospital	h.
Grattan, H. W.	Proceeding to India ..	.. ..	b. c.
Grech, J.	Returning to England, tour expired	.. ..	o.
Gunter, F. E., M.B. ..	Lucknow, India	Specialist in Operative Surgery ..	j.
Gwynn, W. P.	Quetta, India	.. ..	—
Hall, R. J. D.	Up Park Camp, Jamaica	Officer in charge Military Hospital	—
Horrocks, W. H., M.B. ..	London	Expert in Sanitation Army Medical Service Advisory Board	b.
Hale, C. H., D.S.O. ..	York	Company Officer	—
Holt, M. P. C., D.S.O. ..	Kasauli, India	In charge Cantonment Hospital..	j.
Hassard, E. M. ..	Proceeding to India ..	.. ..	—
Hallaran, W., M.B. ..	London	Recruiting Duties	—
Healey, C. W. R.	Kamptee, India	.. ..	—
Hardy, F. W., M.B. ..	Colchester	Sanitary Officer, Eastern Command	b.
Healy, C. J., M.B. ..	Queenstown	Officer in charge Military Hospital	—
Hardy, W. E.	Wynberg, S. Africa ..	.. ..	—
Hennessy, J., M.B. ..	Poonamallee, India ..	Officer in charge Section Hospital	—
Hinge, H. A.	Ootacamund, India ..	Staff Officer Divisional Medical Mobilisation Stores, 9th Division	—
Harrison, W. S., M.B. ..	R.A.M. College	Professor of Tropical Medicine ..	c.
Howell, H. A. L.	Gibraltar	.. ..	f.
Hayes, E. C.	Cosham	Sanitary Officer, Portsmouth Dist.	b. k.
Hooper, A. W., D.S.O. ..	Shorncliffe	.. ..	—
Hewetson, H.	Mill Hill	Officer in charge Military Hospital	a. b.
Hudleston, W. E. ..	Southern Command ..	.. ..	b. f.
Hopkins, C. H.	.. ..	Sick leave	f.
Inniss, B. J.	Returning to England, tour expired	.. ..	—
Julian, O. R. A., C.M.G. (Brevet-Lieut.-Colonel)	Kasauli, India	Officer in charge Military Hospital and Civil Surgeon	b.
Jackson, R. W. H., M.B.	Up Park Camp, Jamaica..	Sanitary Officer	b.
Jennings, J. W., D.S.O.	Western Command ..	.. ..	o.
Jameson, J. C., M.B. ..	Khartoum, Egypt ..	Officer in charge Military Hospital	b.
Johnson, H. P., M.R.C.P. Lond.	Bloemfontein, S. Africa ..	.. ..	—
Jones, T. P., M.B. ..	Woolwich	Registrar, Royal Herbert Hospital	—
Kelly, J. F. M., M.B. ..	Proceeding to S. Africa ..	.. ..	—
Keble, A. E. C.	Gibraltar	Officer in charge Garrison Disp. Staff and Departments	h. b.
Kiddle, F., M.B.	Royal Hospital, Chelsea..	Deputy Surgeon	k.
Killery, St. J. B.	Returning to England, tour expired	.. ..	—
Leishman, Sir W. B., Knt. M.B. (Brevet-Lieut.-Col.)	R.A.M. College, London..	Professor of Pathology	—
Luther, A. J.	Thayetmyo, India ..	Officer in charge Military Hospital	—
Lenehan, T. J., M.B. ..	Seaforth	,, ,, ,, ,,	—
Lawson, C.B., M.B. ..	Netley	Officer in charge Surgical Division and Anæsthetist	o. j.
Lewis, R. C.	Pembroke Dock	.. ..	—
Longhurst, B. W.. ..	Warley	Officer in charge Military Hospital	d.
Lawson, D.	Netley	Officer in charge Venereal Division and Anæsthetist	—
Lowsley, M. M.	India	.. ..	h.
Morgan, F. J.	Barrackpore, India ..	Officer in charge Military Hospital	—
McCulloch, T., M.B. ..	Lebong, India	,, ,, ,, ,,	—
Macdonald, S., M.B. ..	Kowloon, China	,, ,, ,, ,,	—
Morgan, J. C.	Cahir	Officer in charge Military Hospital	b.
Moores, S. G.	Aldershot	.. ..	b.
Mould, W. T.	Dover	Company Officer	—

Name.	Station.	Appointment	Specialist Certificates in
McLoughlin, G. S., D.S.O., M.B.	Chester	Medical Inspector of Recruits, Western Command	—
Mawhinny, R. J. W. ..	Athlone	Officer in charge Military Hospital	—
MacCarthy, I. A. O. ..	Tanglin, Straits Setts. ..	Officer in charge Military Hospital and Officer Commanding 32nd Coy. R.A.M.C.	—
Morphew, E. M.	Roorkee, India	Officer in charge Military Hospital	—
Mitchell, L. A., M.B. ..	Woking	,, ,, ,, ,,	—
Martin, C. B., M.B. ..	Netley	Secretary and Registrar	—
McNaught, J. G., M.D...	Pretoria, S. Africa ..	.. ..	b.
McDermott, T., M.B. ..	Lucknow, India	Specialist in Ophthalmology ..	k.
More, L. P., M.B. ..	Rawalpindi, India ..	Staff Officer Medical Mobilisation Stores, 2nd Division	—
Moore, G. A., M.D. ..	Woolwich	Med. Off. R.M. Academy, Specialist in Laryngology	g.
Marder, N.	Cosham	.. ..	—
Mansfield, G. S., M.B. ..	Norwich	Officer in charge Military Hospital	—
Mangin, F. M.	Aldershot	Specialist in Ophthalmology ..	k.
McMunn, J. R.	Pretoria, S. Africa ..	Staff Offi. to P.M.O., South Africa	f.
Master, A. E., M.B. ..	Chatham	Company Officer	g.
Morgan, C. K., M.B. ..	Dundalk	Officer in charge Military Hospital	o.
Milner, A. E.	London	Leave	o.
Maurice, G. T. K. ..	Muttra, India	.. ..	m.
Morris, A. H.	Edinburgh..	Sanitary Officer	b. c.
MacDougall, A. J., M.B...	Colombo, Ceylon	,, ,, ...	c.
Marriott, E. W. P. V. ..	Gibraltar	.. ..	o.
McKessack, P., M.B. ..	Vacoas, Mauritius ..	Officer in charge N.D. Hospital, Sanitary Officer	b. c.
McCarthy, J. McD., M.B.	Chester	Sanitary Offi., Western Command	a. b. p.
Martin, H. G.	Agra, India	Specialist in Midwifery and Electrical Science, Special Plague Officer	h.
Macpherson, J. D. G., M.B.	Meerut, India	Specialist in Operative Surgery ..	—
Norrington, H. L. W. ..	Chatham	Officer in charge Mil. Families' Hospital	h.
Nickerson, W. H. S., V.C., M.B.	York	Sanitary Offi. Northern Command	b. c.
O'Reilly, H. W. H., M.B.	Colchester	.. ..	—
O'Grady, S. de C., M.B...	Cairo, Egypt	Officer in charge troops, Abbassia	a.
Robinson, O. L.	India	.. ..	b.
Poole, W. C., M.B. ..	Proceeding to India ..	.. ..	b.
Pocock, H. I.	Kailana, India	Officer in charge Section Hospital	d.
Parry, H. J., D.S.O., M.B.	Maritzburg, S. Africa	Officer in charge Military Hospital	—
Powell, E. E.	Bordon	.. ..	—
Pearse, A.	Woolwich	.. ..	b. p.
Porter, F. J. W., D.S.O.	Tower Hill, W. Africa ..	Senior Medical Officer	—
Pilcher, E. M., D.S.O., M.B., F.R.C.S.Eng.	Blakang Mati, Straits Setts.	Officer in charge Military Hospital	j.
Pollock, C. E.	War Office, London ..	Headquarter Staff	e. o.
Prynne, H. V.	Gibraltar	.. ..	k.
Profeit, C. W., M.B. ..	Bulford	Officer in charge Military Hospital	g.
Perry, S. J. C. P... ..	Brighton	,, ,, ,, ,,	o.
Probyn, P. J., D.S.O., M.B.	Victoria, S. China ..	Sanitary Officer, Company Officer	b.
Poe, J. M. B.	South Africa	.. ..	—
Penny, F. S., M.B. ..	Chatham	Officer in charge Casualty Hospital	a. b.
Ritchie, J., M.B... ..	Proceeding to India ..	.. ..	—
Rawnsley, G. T.	Aldershot	.. ..	—
Reilly, C. W.	Dum Dum, India	Officer in charge Military Hospital, Civil Surgeon	b.
Robinson, O. L.	India	.. ..	b.
Read, H. W. K.	Returning to England, tour expired	.. ..	—

Name.	Station.	Appointment.	Specialist Certificates in
Rivers, J. H.	Woolwich	Sick leave	o.
Riddick, G. B.	Calcutta, India	Officer in charge Garrison Disp., Ft. William, Deptmtl. Followers' Hosp. Hastings, Staff Surgeon	—
Rattray, M. MacG., M.B.	Bangalore, India	Leave	—
Ross, N. H., M.B. ..	Aldershot	O.C. "A" Coy., Depôt, R.A.M.C.	—
Scott, B. H.	Edinburgh	Medical Inspector of Recruits ..	b.
Stone, C. A., M.D. ..	Bellary, India	Officer in charge Military Hospital	—
Smith, F., D.S.O. ..	Rawalpindi, India ..	Sanitary Officer, 2nd Division ..	b.
Smithson, A. E., M.B. ..	Harrismith, S. Africa ..	Officer in charge Military Hospital	b. p.
Shanahan, D. D.	Secunderabad, India ..	,, ,, ,, ,,	—
Stalkartt, C. E. G., M.D.	Gosport	Officer in charge Military Hospital	—
Stanistreet, G. B., M.B. ..	Salisbury	Staff Officer to Principal Medical Officer, Southern Command	—
Slayter, E. W., M.B. ..	Secunderabad, India ..	.. ..	—
Symons, F. A., M.B. ..	Newara Eliya, Ceylon ..	Officer in charge Military Hospital	—
Samman, C. T.	Proceeding to India ..	.. ..	n. b.
Spencer, C. G., M.B., F.R.C.S.Eng.	R.A.M. College, London..	Professor of Military Surgery ..	j.
Silver, J. P., M.B. ..	Edinburgh	Company Officer	—
Sweetnam, S. W... ..	Kirkee, India	Officer in charge Military Hospital	—
Steel, E. B., M.B. ..	Neemuch, India	Officer in charge Military Hospital, Specialist in Mental Science	n.
Staddon, H. E.	Curragh	.. ..	—
Smith, L. F., M.B. ..	Proceeding to India ..	.. ..	f. b.
Statham, J. C. B. ..	Pretoria, S. Africa ..	Bacteriologist and Sanitary Officer	b. c. p.
Swabey, M.	Jubbulpore, India ..	.. ..	m.
Stammers, G. E. F. ..	Tidworth	Sanitary Officer, Tidworth District	a. b.
Stallard, H. G. F. ..	Aldershot	Officer Commanding "C" Company, Depôt, R.A.M.C.	—
Thurston, H. C., C.M.G...	St. George's, Bermuda ..	Officer in charge Military Hospital	—
Thacker, R. C.	Ireland	.. ..	—
Thomson, J., M.B. ..	South Africa	.. ..	—
Tate, G. W., M.B. ..	Dublin	.. ..	b. p.
Tyacke, N.	Devonport	.. ..	—
Thurston, H. S.	London	Coy. Officer, 18th Coy. R.A.M.C.	—
Thompson, A. G., M.B. ..	Ferozepore, India.. ..	In charge Brigade Laboratory ..	b.
Taylor, W. J., M.B. ..	Holywood	Officer in charge Military Hospital	b. o.
Tyrrell, A. F.	Cork	.. ..	—
Tibbits, W., M.B. ..	Shoeburyness	Officer in charge Military and Military Families' Hospital	—
Thom, G. St. C., M.B. ..	Sabathu, India	Officer in charge Military and Cantonment Hospital	l. g.
Watson, J. J. C., C.I.E., M.D., F.R.C.S.Edin.	Portsmouth	.. ..	—
Winter, H. E.	Colaba, India	.. ..	—
Way, L.	Cosham	Company Officer	—
Williams, E. McK. ..	Sheffield	Officer in charge Military Hospital	—
Whitestone, C. W. H., M.B.	Peshawar, India	Officiating Staff Officer for Medical Mobilisation Store	—
Wade-Brown, F. J. ..	Kirkee, India	Leave	—
Withers, S. H., M.B. ..	Gharial, India	Officer in charge Military Hospital	—
Williams, E. M.	Fermoy	Officer in charge Mil. Families' Hospital	h.
Waring, A. H.	Secunderabad, India ..	Specialist in Electrical Science ..	o.
Ward, W. A.	Rochester Row, London..	.. ..	e.
Wanhill, C. F.	R.A.M. College	Assistant Professor Hygiene ..	b. c.
Watts, B.	Campbellpore, India ..	Officer in charge Military Hospital	b. h.
Young, C. A.	Curepipe, Mauritius ..	Officer in charge Military Hospital and Officer Commanding 31st Coy. R.A.M.C.	—
Young, A. H. O.	St. George's, Bermuda ..	Officer in charge Women and Children	—

CAPTAINS.

Name.	Station.	Appointment.	Specialist Certificates in
Archer, G. J. S., M.B. ..	India	.. ..	j.
Ashe, F.	Colchester	In charge Families' Hospital ..	h.
Anderson, H. S.	Fermoy	.. ..	—
Adye-Curran, W. J. P. ..	Cosham	Specialist in Operative Surgery ..	j.
Argles, R. L.	Multan, India	.. ..	—
Adderley, A. C.	R.A.M. College	.. ..	—
Aylen, E. V.	Kirkee, India	.. ..	e.
Adye-Curran, S. M. ..	Kilkenny	Officer in charge Military Hospital	b.
Ainsworth, R. B.	R.A.M. College	.. ..	b.
Ahern, D.	,, ,, ...	.. ..	—
Anderson, R. G.	Attached Egyptian Army	.. ..	—
Ahern, M. D.	Ferozepore, India ..	.. ..	—
Arthur, A. S., M.B. ..	Returning to England, tour expired	.. ..	—
Anderson, J. A., M.B. ..	Bloemfontein, S. Africa ..	Leave	—
Anthonisz, E. G.	Madras, India	Staff-Surgeon, Fort St. George ..	—
Archibald, R. G., M.B. ..	Attached Egyptian Army	.. ..	—
Berne, J. G.	Colaba, India	Leave	g.
Barrow, H. P. W... ..	Liverpool	Adjutant, West Lancashire Division, R.A.M.C.T.	c. p.
Brakenbridge, F. J. ..	Rochester Row, London..	.. ..	b.
Blackwell, W. R... ..	Lucknow, India	Staff-Surgeon	—
Butler, S. G.	Pretoria, S. Africa ..	.. ..	j.
Bond, J. H. R.	Proceeding to India ..	.. ..	—
Babington, M. H. ..	Valletta, Malta	.. ..	c.
Baker, W. L.	Cottonera, Malta	Specialist in Ophthalmology ..	k.
Bennett, W., M.B. ..	Cork	.. ..	a.
Biggam, T. M. B... ..	Aldershot	.. ..	—
Bartlett, B. S.	Colchester	Anæsthetist..	—
Bennett, E.	Wolverhampton	Adjutant, North Midland Division R.A.M.C.T.	—
Brown, R. T., M.D. ..	Proceeding to India ..	.. ..	b. c.
Bennett, W. L., M.B., F.R.C.S.Edin.	Proceeding to Bermuda ..	.. ..	—
Burke, B. B.	Devonport	Specialist in Otology	l.
Baillie, G., M.B.	Bulford	.. ..	—
Black, R. B., M.B. ..	Attached Egyptian Army	.. ..	—
Brunskill, J. H., M.B. ..	Dalhousie, India	Leave	—
Bateman, H. R.	Uganda	Sleeping Sickness Commission ..	c.
Bransbury, H. A... ..	Woolwich	Specialist in Dermatology ..	e.
Barbour, J. H., M.B. ..	Jubbulpore, India.. ..	Offi. in charge Gun Carriage Fact.	—
Bostock, J. S., M.B. ..	Aldershot	Company Officer Nos. 1 and 3 Coy. R.A.M.C.	—
Beatty, M. C., M.B. ..	R.A.M. College	.. ..	b.
Balck, C. A. J. A., M.B. ..	,, ,, ...	.. ..	—
Bagshawe, H. V.	,, ,, ...	.. ..	—
Browne, W. W.	,, ,, ...	.. ..	b.
Bell, J. G., M.B.	Liverpool	.. ..	—
Bridges, R. H.	Aldershot	.. ..	—
Brown, G. H. J., M.B. ..	Delhi, India	.. ..	—
Bramhall, C.	Lichfield	.. ..	—
Bousfield, L., M.D. ..	Attached Egyptian Army	.. ..	—
Bowle, S. C.	Deolali, India	Officer in charge Cantonment Hosp.	—
Byam, W.	Cairo, Egypt	.. ..	—
Beadnell, H. O. M. ..	Lahore Cantonment, India	.. ..	—
Buchanan, R. J. B. ..	Portsmouth	.. ..	b.
Booth, E. B., M.D. ..	Kamptee, India	Officer in charge Cantonment Hosp.	—
Brown, C. G.	Lucknow, India	.. ..	—
Benson, W., M.B. ..	Rawalpindi, India ..	.. ..	—
Bryden, R. A.	Bloemfontein, S. Africa ..	Leave	—
Blackwell, T. S.	Secunderabad, India ..	.. ..	—

Name.	Station.	Appointment.	Specialist Certificates in
Bond, A. H.	Rangoon, India	.. ..	—
Collingwood, P. H. ..	Returning to England, tour expired	.. ..	—
Crisp, G. B.	Mhow, India	Staff Offi. for Mobilisation Stores	—
Cowan, J., M.B.	Woolwich	Clinical Pathologist	c.
Curme, D. E.	Aldershot	.. ..	—
Cunningham, R. A., M.B.	Proceeding to India ..	.. ..	b.
Crawford, V. J.	Portsmouth	Officer in charge Military Families' Hospital	h.
Chopping, A.	Peshawar, India	Specialist in X-rays	—
Connolly, E. P.	Cardiff	Adjutant, Welsh Div. R.A.M.C.T.	—
Cumming, C. C., M.B. ..	Millbank, London	.. ..	c.
Carylon, A. F.	Mount Auriol, W. Africa	Officer in charge Military Hospital	—
Croly, W. C.	R.A.M. College	.. ..	—
Cotton, F. W.	On leave	.. ..	—
Carroll, G...	Proceeding to South Africa	.. ..	—
Churton, J. G.	Proceeding to India ..	.. ..	j.
Cuthbert, J. M., M.B. ..	Tower Hill, W. Africa ..	Sanitary Officer	c.
Carr, C. H., M.D. ..	Tidworth	.. ..	d.
Crosthwait, W. S... ..	Cahir	Leave	—
Cautley, J. B.	Cawnpore, India	Officer in Medical charge Harness and Saddle Factory and Departmental Followers' Hospital	d.
Cowey, R. V.	Tidworth	Offi. in charge Military Families' Hospital	h.
Clarke, J. B., M.B. ..	West Africa	.. ..	j.
Cotterill, L.	R.A.M. College	.. ..	—
Craig, B. A.	Victoria, S. China ..	.. ..	—
Crossley, H. J.	R.A.M. College	.. ..	—
Clarke, F. A. H.	,, ,, ...	.. ..	—
Conway, J. M. H., F.R.C.S.I.	,, ,, ...	.. ..	—
Coates, T. S., M.B. ..	,, ,, ...	.. ..	—
Carmichael, J. C. G., M.B.	Fleetwood	Officer in charge Military Hospital	—
Carmichael, D. G., M.B.	Newport	,, ,, ,, ,,	—
Crawford, J. M. M. ..	Woolwich	Adjutant, 12th and 34th Coys. R.A.M.C.	—
Collins, R. T.	Returning to England, tour expired	.. ..	—
Cathcart, G. E.	Khanspur, India	Officer in charge Military Hospital	—
Cahill, R. J., M.B. ..	Bangalore, India	.. ..	—
Connell, H. B.	Aldershot	.. ..	—
Campbell, J., M.B. ..	Allahabad, India	Offi. in charge Brigade Laboratory, Spec. in Prevention of Disease	b.
Cordner, R. H. L. ..	Rawalpindi, India ..	.. ..	—
Carter, H. St. M., M.D..	Cottonera, Malta	Company Officer	—
Churchill, G. B. F. ..	Lucknow, India	.. ..	—
Cromie, M. J.	Delhi, India	Leave	—
Cummins, A. G., M.B. ..	Trincomali, Ceylon ..	Officer in charge Military Hospital	—
Delap, G. G., D.S.O. ..	Aldershot	Assist. Inst., R.A.M.C. School of Instruction, and O.C. "B" Coy., Depôt, R.A.M.C.	—
Douglas, H. E. M., V.C., D.S.O.	R.A.M. College	.. ..	b.
Dennis, B. R., M.B. ..	Proceeding to Straits Settlements	.. ..	c.
Dorgan, J., M.B... ..	Cork	.. ..	a. b. p.
Douglass, P. C.	Weedon	Officer in charge Military Hospital	—
Duffey, A. C., M.D. ..	Dublin	.. ..	h.
Davidson, H. A., M.B. ..	Queenstown	.. ..	b.
Davis, W.	India	.. ..	—
Davidson, P., D.S.O., M.B.	Netley	.. ..	—
Dawson, F. W. W., M.B.	R.A.M. College	.. ..	—
Dunbar, B. H. V., M.D.	Richmond	Officer in charge Military Hospital	—

Name.	Station.	Appointment.	Specialist Certificates in
Duguid, J. H., M.B.	R.A.M. College	.. ..	—
Dudding, T. S.	Bury	Officer in charge Military Hospital	—
Dunkerton, N. E.	Pretoria, S. Africa	Anæsthetist and Company Officer	—
Douglas, J. H., M.D.	Secunderabad, India	Spec. in Prevention of Disease and in charge Brigade Laboratory	b.
Dwyer, P., M.B.	Jubbulpore, India	Officer in charge Brigade Lab.	—
Davy, P. C. T., M.B.	Nowgong, India	.. ..	—
Doig, K. A. C.	Muttra, India	Doing duty with 15th Hussars	—
Dunn, J. S.	Agra, India	.. ..	—
Drew, C. M., M.B.	Egyptian Army	.. ..	—
De la Cour, G., M.B., B.S.	Bangalore, India	Specialist in Operative Surgery	—
Dawson, A., M.B.	Wellington, India	Specialist in Dermatology	—
Dill, M. G., M.B.	Maidstone	Officer in charge Military Hospital	—
Ellery, E. E.	Egypt	.. ..	j.
Elsner, O. W. A.	Proceeding to S. Africa	.. ..	b.
Ensor, H., D.S.O., M.B.	Attached Egyptian Army	.. ..	c.
Evans, C. R.	Halifax	Officer in charge Military Hospital	—
Ellery, R. F.	India	.. ..	—
Ellis, W. F.	Dalhousie, India	Officer in charge Cant. Hospital	—
Easton, P. G.	R.A.M. College	.. ..	—
Emerson, H. H. A., M.B.	Eastern Command	.. ..	—
Egan, W., M.B.	Multan, India	.. ..	—
Edmunds, C. T.	Cherat, India	.. ..	—
Edwards, G. B.	Port Louis, Mauritius	Officer in charge Military Hospital	—
Fuhr, R. S. H., D.S.O.	Woolwich	Officer in charge Military Families' Hospital	h.
Fell, M. H. G.	Cairo, Egypt	Sanitary Officer	b. p.
Falkner, P. H., F.R.C.S.I.	Watford, Bermuda	Officer in charge Military Hospital	—
Foster, J. G., M.B.	Curragh	Company Officer	—
Ford, E. G., M.B.	India	.. ..	—
Fawcus, H. B., M.B.	Proceeding to S. Africa	.. ..	a. b.
Fielding, T. E., M.B.	On leave	.. ..	c.
Furnivall, C. H.	York	Training Special Reserve	—
Fitzgerald, Fitz G. G.	Dover	In Medical charge Duke of York's School	—
Fry, W. B.	Millbank, London	.. ..	c.
Fleming, C. E., M.B.	Woolwich	Specialist in Ophthalmology	k.
Fawcett, R. F. M.	Gosport	.. ..	—
Falkner, M. W., F.R.C.S.I.	Curragh	Specialist in Operative Surgery	j.
Foulds, M. F.	Belfast	,, ,, ,,	j.
Ffrench, E. G., M.D., F.R.C.S.E.	Edinburgh	.. ..	—
Foster, R. L. V., M.B.	Fethard	Officer in charge of Non-Dieted Hospital	—
Franklin, R. J.	R.A.M. College	.. ..	—
Fawcett, H. H. J.	Gosport	.. ..	—
Fairbairn, J., M.B.	Colaba, India	.. ..	—
Fraser, A. N., M.B.	Glasgow	Adjutant, Lowland Div. R.A.M.C.T.	—
Frost, A. T., M.B.	R.A.M. College	.. ..	—
Ferguson, G. E.	Alexandria, Egypt	.. ..	—
Fawcett, C. E. W. S., M.B.	Bangalore, India	Leave	—
Farrant, P.	Up Park Camp, Jamaica	.. ..	—
Forrest, F.	Ambala, India	.. ..	—
Gallie, J. S.	Ahmednagar, India	Officer in charge Cant. Hospital, Specialist in Dermatology	—
Gill, J. G.	Peshawar, India	Specialist in Ophthalmology	—
Goddard, G. H.	Alderney	Officer in charge Military Hospital	h.
Goldsmith, G. M., M.B.	Maymyo, India	.. ..	—
Greenwood, A. R.	Aldershot	Specialist in Operative Surgery, Connaught Hospital	j.
Goodwin, W. R. P.	Royal Arsenal, Woolwich	.. ..	k.
Gibson, A. W.	Tidworth	Specialist in Operative Surgery	j.
Gatt, J. E. H., M.D.	R.A.M. College	.. ..	—
Gray, A. C. H., M.B.	Aldershot	Company Offi. No. 2 Coy. R.A.M.C.	—

Name.	Station.	Appointment.	Specialist Certificates in
Glanvill, E. M., M.B. ..	Harrismith, S. Africa ..	.. ..	—
Grant, M. F.	Karachi, India	.. ..	—
Garland, F. J., M.B. ..	Aden	Officer in charge Section Hospital Crater	—
Gater, A. W.	Cliffdon, India	Officer in charge Military Families' Hospital	—
Gibbon, T. H., M.D. ..	Valletta, Malta	.. ..	—
Graham, J. H., M.B. ..	Gibraltar	.. ..	—
Gotelee, H. E.	Colombo, Ceylon	.. ..	—
Galwey, W. R., M.B. ..	Ferozepore, India	.. ..	b.
Gillatt, W. H., M.B. ..	Egyptian Army	.. ..	—
Gibson, L. G.	Jullundur, India	.. ..	—
Hall, S. O...	Secunderabad, India ..	Spec. in Midwifery and Diseases of Women and Children	h.
Heffernan, F. J. C., F.R.C.S.I.	Dinapore, India ..	.. ..	—
Herrick, H.	Karachi, India	Staff - Surgeon, Specialist in Dermatology	—
Hewitt, E. P.	India	.. ..	—
Hodgson, J. E.	London	Leave	a.
Houghton, J. W. H., M.B.	Millbank, London ..	.. ..	b.
Harvey, D., M.B... ..	Naini Tal, India	Specialist in Prevention of Dis.	a.
Humphry, L.	Poona, India	Specialist in Operative Surgery..	j.
Harrison, L. W., M.B. ..	Rochester Row, London ..	Specialist in Bacteriology ..	c.
Harvey, F...	Devonport	Sanitary Officer Devonport Dist.	b. c. p.
Hime, H. C. R., M.B. ..	Proceeding to India ..	.. ..	b. k.
Hartigan, J. A., M.B. ..	Shorncliffe	.. ..	—
Hyde, D. O., M.B. ..	Dublin	.. ..	—
Hamerton, A. E., D.S.O.	Uganda	Sleeping Sickness Commission ..	c.
Houghton, G. J.	Limerick	.. ..	—
Henderson, P. H., M.B...	Portsmouth	.. ..	a.
Hunt, R. N., M.B. ..	Bordon	.. ..	—
Howley, H. E. J. A. ..	Lichfield	Training Special Reserve..	—
Hull, A. J...	Jutogh, India	Officer in charge Military and Cantonment Hospital	—
Harding, D. L., F.R.C.S.I.	R.A.M. College	.. ..	—
Hyde, P. G., M.B. ..	Queenstown	.. ..	—
Harvey, W. J. S... ..	R.A.M. College	.. ..	—
Hayes, A. H.	,, ,, ...	.. ..	—
Harding, N. E. J., M.B...	,, ,, ...	.. ..	p.
Holden, C. W.	Peking, North China ..	Officer in charge Military Hospital	b. p.
Harty, T. E.	Mandalay, India	,, ,, ,, ,,	—
Hughes, G. W. G. ..	Attached Egyptian Army	.. ..	—
Hanafin, P. J.	Wynberg, S. Africa ..	.. ..	b.
Hildreth, H. C., F.R.C.S. Edin.	Maymyo, India	Staff-Surgeoncy, Burma Division	—
Hole, R. B., M.B. ..	Quetta, India	.. ..	—
Harding, H., M.B. ..	Quetta, India	.. ..	—
Hayes, G. S. C.	London	.. ..	h.
Hallowes, R. C., M.B. ..	Cairo, Egypt	Officer in charge Troops, Kasr-el-Nil	—
Harvey, G. A. D... ..	Khartoum, Egypt ..	.. ..	—
Heron, G. W.	Egyptian Army	.. ..	—
Hoar, J. E.	Secunderabad, India ..	.. ..	—
Humfrey, R. E., M.B. ..	Nasirabad, India ..	Leave	—
Hastings, A. E. F. ..	Allahabad, India	Staff-Surgeon	—
Honeybourne, V. C. ..	Uppa Topa, India ..	Officer in charge Military Hospital	—
Howell, F. D. G... ..	Chakrata, India	Staff-Surgeon	—
Inkson, E. T., V.C.	Bangalore, India	.. ..	—
Irvine, F. S., M.B. ..	Aldershot	.. ..	—
Irwin, A. W. A.	Kildare	Officer in charge Military Hospital	—
Ievers, O., M.B.	Pretoria	Officer in change Non-dieted Hosp., Artillery Barracks	—
Irvine, A. E. S.	Potchefstroom, S. Africa	... .	—

Name.	Station.	Appointment.	Specialist Certificates in
Jameson, A. D.	Aldershot	Specialist in Dermatology and Venereal Disease, Connaught Hospital	e.
Johnson, J. T., M.D.	Newcastle-on-Tyne	..	b.
Jones, J. L.	R.A.M. College	..	—
Johnstone, D. P.	Maymyo, India	Offig. Divisional Sanitary Officer	b.
Johnson, V. G.	Peshawar, India	..	—
Knox, E. B., M.D.	Colchester	..	b.
Kennedy, J. C., M.B.	R.A.M. College	Assistant Professor of Pathology	c. p.
Kiddle, H. H.	,, ,,	..	—
Kelly, W. D. C., M.B.	,, ,,	..	—
Kelly, H. B., M.B.	Dublin	..	—
Kempthorne, G. A.	Lahore Cantonment, India	Staff-Surgeon	—
Keane, M.	Muttra, India	..	—
Lauder, T. C., M.B.	Tower Hill, W. Africa	Officer in charge Military Hospital	b. p.
Leake, J. W.	Devonport	..	a. b
Lloyd, R. H.	Exeter	Adjutant, Wessex Div. R.A.M.C.T.	—
Langstaff, J. W.	Aldershot	..	b.
LLoyd, L. N., D.S.O.	London	Adjutant, 1st and 2nd London Division R.A.M.C.T.	—
Lauder, F. P.	Aldershot	..	—
Lelean, P. S., F.R.C.S. Eng.	Meerut, India	Temp. Sanitary Officer, 7th Div.	b. j.
L'Estrange, E. F. Q.	Bellary, India	..	—
Lambelle, F. W., M.B.	York	Specialist in Operative Surgery	j.
Long, H. W., M.B.	R.A.M. College	..	—
Lambert, F. C.	Cape Town, S. Africa	Embarking Medical Officer	—
Lewis, S. E., M.B.	Simonstown, S. Africa	Officer in charge Troops	—
Lewis, R. R.	Secunderabad, India	Specialist in Dermatology	—
Lucas, T. C., M.B.	Bombay, India	Surg. to H.E. the Governor of Bombay.	b.
Luxmoore, E. J. H.	Meerut, India	..	—
Low, N.	Cannanore, India	Officer in charge Military Hospital	—
Lloyd-Jones, P. A., M.B.	Forrest, Malta	..	—
Lynch, J. P.	Meiktila, India	Officer in charge Military Hospital	—
Lithgow, E. G. R.	Rawalpindi, India	..	—
Lewis, R. P.	Bloemfontein, S. Africa	..	—
Littlejohns, A. S.	Pretoria, S. Africa	..	—
Leslie, T. C. C.	Maritzburg, S. Africa	..	—
Mainprise, C. W.	Proceeding to India	..	—
MacKenzie, T. C., D.S.O.	Attached Egyptian Army	..	—
Morton, H. M., M.B.	Proceeding to S. Africa	..	—
Matthews, J.	Karachi, India	Specialist in Ophthalmology	k.
McLoughlin, W. M.	Aldershot	..	—
MacLaughlin, A. M., M.B.	On leave	..	a.
Martin, J. F., M.B.	R.M. College, Sandhurst	Assistant Surgeon	—
McDonnell, E., M.B.	Proceeding to Bermuda	..	—
McLennan, F., M.B.	Fort George	Officer in charge Military Hospital	—
Murphy, J. P. J., M.B.	Woolwich	..	b.
Myles, C. D., M.B.	R.A.M. College	..	b.
Mitchell, A. H. McN.	Plymouth	..	k.
McMunn, A.	R.A.M. College	..	—
McKenzie, J. M. B.	,, ,	..	—
Meadows, S. M. W.	Rawalpindi, India	Officer in charge Mil. Families' Hospital and Staff-Surg. "A"	—
Meldon, J. B.	Dublin	..	—
MacNicol, R. H., M.B.	Scottish Command	..	—
McEntire, J. T., M.B.	Potchefstroom, S. Africa	Sanitary Officer	—
MacDowell, W. MacD.	Ireland	..	—
Moore, E. H. M.	Potchefstroom, S. Africa	..	—
Meaden, A. A.	Neemuch, India	Officer in charge Followers' Hosp.	—
Millar, C. R.	R.A.M. College	..	—
Maughan, J. St. A.	Cottonera, Malta	..	—
Meredith, R. G., M.B.	,, ,,	..	—

Name.	Station.	Appointment.	Specialist Certificates in
McNeight, A. A., M.B. ..	Cawnpore, India	.. ..	—
Maydon, W. G., M.B. ..	Bangalore, India	.. ..	—
Moss, E. L.	Chaubuttia, India ..	Officer in charge Section Hospital	—
Moriarty, T. B.	Lucknow, India	Officer in charge X-rays Apparatus, Specialist in Electrical Science, 8th Division	—
McConaghy, W., M.B. ..	Pretoria, S. Africa ..	.. ..	—
Marett, P. J.	Cottonera, Malta	.. ..	—
McCammon, F.A., M.B.	Quetta, India	.. ..	—
Morris, C. R. M., M.B. ..	Sialkot, India	.. ..	—
Mulligan, J. B. G. ..	Forrest, Malta	.. ..	—
Nicholls, H. M., M.B. ..	Deolali, India	Officer in charge Military Hospital, Specialist in Ophthalmology	—
Norman, H. H.	Bhamo, India	Officer in charge Military Hospital	—
Nokes, F. H., M.B. ..	Purandhur, India ..	,, ,, ,, ,,	—
Nealor, W. S.	Thayetmyo, India ..	.. ..	—
Nimmo, W. C.	Fyzabad, India	.. ..	—
Newman, R. E. U., M.B...	Camp Haveliyan, India ..	.. ..	—
O'Gorman, C. J., D.S.O...	Proceeding to India ..	.. ..	—
O'Flaherty, A. R. ..	Devonport	Company Officer	—
Ormsby, G. J. A., M.D...	Fyzabad, India	Staff-Surgeon	—
O'Reilly, P. S.	Sitapur, India	Officer in charge Military Hospital	k.
O'Donoghue, D. J. F. ..	Mabanta, W. Africa ..	,, ,, ,, ,,	—
Ommanney, F. M. M. ..	Aden	Leave	—
Osburn, A. C.	Mandalay, India	Temp. Offi. in charge Military Hosp.	—
Otway, A. L., M.B. ..	Returning to England, tour expired	.. ..	—
O'Brien, C. W.	Peshawar, India	Specialist in Operative Surgery ..	—
Ormrod, G., M.B. ..	Landour, India	Staff-Surgeon	—
O'Carroll, A. D., M.B. ..	Dagshai, India	.. ..	—
O'Neill, E. M., M.B. ..	Jhansi, India	.. ..	—
O'Grady, D. De C.	Nowshera, India	.. ..	—
Parker, L. E. L.	Poona, India	Sanitary Officer, 6th Division ..	c. b.
Packer, H. D.	Crownhill	.. ..	c.
Palmer, H. K.	Colaba, India	.. ..	—
Palmer, F. J.	Proceeding to India ..	.. ..	j.
Prescott, J. J. W., D.S.O.	Newcastle	Adjutant, Northumbrian Division R.A.M.C.T.	k.
Parry, F. M., M.B. ..	Maidstone	Adjutant, Home Counties Division R.A.M.C.T.	—
Powell, J., M.B.	Wilberforce, W. Africa ..	Officer in charge Military Hospital	—
Purser, L. M., M.B. ..	Proceeding to India ..	.. ..	g. l.
Popham, R. L.	Dublin	With Special Reserve	—
Power, W. M.	Jamaica	.. ..	h.
Pinches, H. G.	Netley	With Special Reserve	—
Parsons, A. R. C... ..	Port Lokkoh, W. Africa..	Officer in charge Military Hospital	j.
Powell, E. W.	Belgaum, India	Officer in charge Brigade Lab. and Cantonment Hospital, Specialist in Prevention of Disease	c.
Parkes, E. E., M.B. ..	Plymouth	.. ..	k.
Potter, T. J.	Millbank, London ..	Clinical Pathologist	b. c.
Pennefather, E. M. ..	Fermoy	.. ..	—
Patch, B. G.	Ireland	.. ..	—
Powell, J. E.	Ranikhet, India	Staff-Surgeon and in charge Cantonment General Hospital and Civil Medical Officer	—
Pallant, S. L.	Mhow, India	Consulting Surgeon, R.M. Railway	—
Painton, G. R.	West Africa	.. ..	—
Power, P., M.B.	R.A.M. College	.. ..	—
Pascoe, J. S.	Cyprus	Officer in charge Military Hospital	—
Potts, E. T., M.D. ..	Pretoria, S. Africa ..	.. ..	—
Priestley, H. E.	Gibraltar	.. ..	—
Paine, E. W. M.	Calicut, India	Officer in charge Military Hospital	—
Rutherford, N. J. C., M.B.	Proceeding to S. Africa ..	.. ..	—

Name.	Station.	Appointment.	Specialist Certificates in
Richards, F. G.	Port Royal, Jamaica ..	Officer in charge Military Hospital	—
Roch, H. S.	Leeds	Adjutant, West Riding Division R.A.M.C.T.	c.
Robinson, J. H.	Curragh	Officer in charge Military Families' Hospital	h.
Ronayne, C. R. L., M.B.	Preston	.. ..	k.
Riach, W., M.D.	Wonkufu, W. Africa ..	Officer in charge Military Hospital	b. k.
Ryan, E.	Aldershot	.. ..	h.
Rowan-Robinson, F. E., M.B.	R.A.M. College	.. ..	—
Ritchie, T. F., M.B. ..	,, ,, ...	.. ..	—
Rogers, H., M.B... ..	Queenstown	.. ..	—
Reed, G. A. K. H. ..	R.A.M. College	.. ..	—
Rutherford, R., M.B. ..	,, ,, ...	.. ..	—
Ranking, R. M., M.B. ..	,, ,, ...	.. ..	—
Richmond, J. D., M.B. ..	Quetta, India	Staff-Surgeon	—
Rugg, G. F.	R.A.M. College	.. ..	—
Ryley, C.	,, ,, ...	.. ..	b.
Russell, H. W., M.D. ..	,, ,, ...	.. ..	—
Richard, G. H.	Calcutta, India	.. ..	—
Roberts, F. E.	Valletta, Malta	.. ..	—
Rahilly, J. M. B., M.B.	Cairo, Egypt ..	.. ..	—
Rose, A. M., M.D. ..	Prospect, Bermuda ..	Sanitary Officer	b.
Rees, G. H., M.B. ..	Cairo, Egypt	.. ..	—
Ritchie, M. B. H., M.B.	Rawalpindi, India ..	.. ..	—
Selby, R., M.B.	Meerut, India	Staff-Surgeon in charge R.A. Followers' Hospital, Specialist in Dermatology	e.
Scott, A. L.	Aldershot	.. ..	c.
Sloan, J. M., M.B., D.S.O.	Aberdeen	Adjt., Highland Div. R.A.M.C.T.	a
Simson, H.	India	.. ..	a
Seeds, A. A., M.D. ..	Hounslow	.. ..	—
Siberry, E. W.	Proceeding to S. Africa ..	.. ..	—
Smith, C. S., M.B. ..	Mullingar	Officer in charge Military Hospital	—
Safford, A. H.	Fyzabad, India	Officer in charge Brig. Laboratory, Spec. in Prevention of Disease	b. c.
Sewell, E. P., M.B. ..	Belfast	Sanitary Officer, Belfast District	a. b.
Straton, C. H.	London	Sanitary Officer, area S. of Thames	a.
Spiller, W. M. H., M.B...	Belfast	Company Officer	b. c.
Shea, H. F., M.B. ..	Millbank, London ..	.. ..	—
Stephens, F. A.	Birmingham	Adjutant, South Midland Division R.A.M.C.T.	—
Steele, W. L.	R.A.M. College	.. ..	—
Sparkes, W. M. B. ..	Uganda	.. ..	l.
Smith, S. B., M.D. ..	Dublin	.. ..	—
Skinner, R. McK. ..	Proceeding to Straits Setts.	.. ..	h.
Sheehan, G. F.	Dublin	.. ..	n.
Sampey, A. W.	R.A.M. College	.. ..	b. p.
Smallman, A. B., M.B. ..	Quetta, India	Sanitary Officer, 4th Division ..	b.
Storrs, R.	R.A.M. College	.. ..	—
Seccombe, J. W. S. ..	Jullundur, India	Officer in charge Brig. Laboratory	b.
Skelton, D. S.	.. ..	Leave	b.
Stanley, C. V. B., M.D...	Egyptian Sanitary Dept.	.. ..	—
Stack, H. T., M.B. ..	Belfast	.. ..	—
Sylvester-Bradley, C. R.	Warley	.. ..	—
Sidgwick, H. C., M.B. ..	Up Park Camp, Jamaica	.. ..	—
Sinclair, M., M.B. ..	Sialkot, India	.. ..	—
Sherren, G. H.	Belgaum, India	Special duty with 2nd Leicestershire Regiment	—
Scatchard, T.	Agra, India	.. ..	—
Symons, V. H.	Bloemfontein, S. Africa..	.. ..	—
Sampson, F. C., M.B. ..	,, ,, ..	Anæsthetist	—
Smyth, R. S., M.D. ..	Ambala, India	.. ..	—
Stewart, H., M.B. ..	Peshawar, India	.. ..	—

Name.	Station.	Appointment.	Specialist Certificates in
Sutcliff, A. A., M.B. ..	Tanglin, Straits Settlements	.. ..	—
Sampson, P.	Jhansi, India	.. ..	—
Scott, J. W. L.	Quetta, India	.. ..	—
Smales, W. C.	Poona, India	Officer in charge Cant. Hosp. and Spec. in Electrical Science	—
Stewart, P. S., M.B. ..	Cottonera, Malta.. ..	.. ..	—
Sexton, T. W. O... ..	Pretoria, S. Africa ..	.. ..	—
Thorp, A. E.	Cosham	Anæsthetist..	—
Taylor, H. S.	Fort Canning, Strait Setts.	Officer in charge Military Hospital	—
Tobin, J.	Devonport	Officer in charge Mil. Fam. Hosp.	h.
Thorpe, L. L. G... ..	Netley	.. ..	—
Thomson, C. G.	Amritsar, India	Officer in charge Military and Cantonment Hospitals	—
Tyndale, W. F., C.M.G., M.B.	R.A.M. College	.. ..	b.
Turner, F. J.	Jubbulpore, India ..	Staff-Surgeon	—
Thomson, D. S. B., M.B.	Attached Egyptian Army	.. ..	—
Turner, C. H.	Murree, India	Staff-Surgeon and Specialist in Operative Surgery	—
Turnbull, J. A.	Cherat, India	.. ..	—
Thurston, L. V.	Jubbulpore, India ..	.. ..	—
Thomson, C. P., M.D. ..	Egyptian Army	.. ..	—
Thompson, R. J. C. ..	Pretoria, S. Africa ..	Leave	—
Tabuteau, G. G.	Jhansi, India	Staff-Surgeon	—
Tate, R. G. H., M.D. ..	Ambala, India	Officer in charge Brig. Laboratory	b.
Unwin, T. B., M.B. ..	Aldershot	.. ..	—
Vaughan, W. F. H. ..	Sick leave	.. ..	—
Vidal, A. C.	South Africa	.. ..	—
Weld, A. E.	Valletta, Malta	In charge Military Families' Hosp.	h.
Walton, H. B. G. ..	Pontefract	Officer in charge Military Hospital	b. c.
Winkfield, W. B... ..	Portland	,, ,, ,, ,,	—
Wroughton, A. O. B. ..	Canterbury..	.. ..	—
Woodside, W. A... ..	Ipswich	Adjutant, East Anglian Division R.A.M.C.T.	—
Webb, A. L. A.	Proceeding to W. Africa..	.. ..	a. b. p.
Winslow, L. F. F. ..	Bradford	Officer in charge Military Hospital	—
Wood, L.	Fleetwood	,, ,, ,, ,,	—
Wingate, B. F.	Solon, India	Officer in charge Military and Cantonment Hospital	—
Walker, F. S., F.R.C.S.I.	Crownhill	.. ..	—
Waring, A. D., M.B. ..	Proceeding to Hong Kong	.. ..	—
Weston, A. F.	Cosham	Specialist in Bacteriology ..	c.
Waters, W. J.	Devonport	With Special Reserves	—
Whelan, J. F., M.B. ..	R.A.M. College	.. ..	—
West, J. W., M.B. ..	Dublin	Specialist in Operative Surgery ..	j.
Worthington, E. S. ..	R.A.M. College	.. ..	—
Wells, A. J. W.	,, ,, ...	.. ..	—
Woodley, R. N.	Cork	.. ..	—
Winder, J. H. R., M.D...	R.A.M. College	.. ..	—
Wilson, R. C., M.B. ..	Netley	.. ..	l.
Williamson, A. J., M.B...	Woolwich	Specialist in Operative Surgery ..	j.
Walker, N. D., M.B. ..	R.A.M. College	.. ..	b.
Webb, H. G. S... ..	Ambala, India	.. ..	b.
Winder, M. G.	Dover	.. ..	—
Wood, A. E. B., M.B. ..	Shorncliffe	.. ..	—
Webster, J. A. W. ..	Gravesend	Officer in charge Military Hospital	—
Wilmot, R. C.	Dublin	Company Officer	—
Watson, D. P., M.B. ..	Aden	In charge Brigade Laboratory, Staff-Surgeon	—
Wetherell, M. C., M.D...	Returning to England, tour expired	.. ..	—
Wright, T. J.	Bere Island	Officer in charge Non-dieted Hosp.	b.
Whitehead, E. C., M.B...	Pretoria, S. Africa ..	Officer in charge Mil. Fam. Hosp.	—
Wiley, W., M.B.	Bangalore, India	.. ..	—

Name.	Station.	Appointment.	Specialist Certificates in
Wilson, H. T.	Barian, India	Officer in charge Military Hospital, Specialist in Dermatology	—
Winckworth, H. C.	Cork	Anæsthetist	d.
Wallace, G. S., M.B.	R.A.M. College	..	b.
Weston, W. J.	Gibraltar	Anæsthetist	—
Ware, G. W. W., M.B.	Sialkot, India	..	—
Wyatt, C. J., M.B.	Returning to England, tour expired	..	—
White, C. F., M.B.	Darjeeling, India	..	—
Williams, A. S.	Dinapore, India	..	—

LIEUTENANTS.

Name.	Station.	Appointment.	Specialist Certificates in
Amy, A. C., M.B.	Ranikhet, India	..	—
Aviss, W. G.	Quetta, India	..	—
Andrews, L. A. A.	Curepipe, Mauritius	..	—
Benett, A. M.	Jubbulpore, India	..	—
Bradish, F. L.	Jullundur, India	..	—
Bracken, G. P. A.	Secunderabad, India	..	—
Boyce, W. W.	Lahore Cantnmt., India	..	—
Bell, W. J. E., M.B.	Victoria, S. China	..	—
Bowle, C. W.	Dalhousie, India	..	—
Bennett, J. A., M.B.	Mhow, India	..	—
Browne, W. T.	Kamptee, India	..	—
Beaman, W. K.	Imtarfa, Malta	..	—
Boyd, J. E. M.	Ferozepore, India	Staff-Surgeon	—
Byatt, H. V. B.	Proceeding to India	..	—
Blake, H. H., M.B.	Lucknow, India	..	—
Bradley, F. H., M.B.	Edinburgh	Training Special Reserve R.A.M.C.	—
Burney, W. H. S.	Egyptian Army	..	—
Buist, D. S., M.B.	Woolwich	With Special Reserve	—
Bevis, H.	Curragh	..	—
Byrne, A. W., M.B.	Lancaster	Officer in charge Military Hospital	—
Benson, C. T. V.	..	On probation	—
Bevis, A. W.	Chatham	..	—
Beckton, J.	Dover	..	—
Caddell, E. D., M.B.	Ambala, India	Officiating Staff-Surgeon	—
Corbett, D. M., M.B.	,, ,,	..	—
Cooke, O. C. P.	Colaba, India	..	—
Coutts, D., M.B.	Allahabad, India	..	—
Cassidy, C.	Egyptian Army	..	—
Chapman, F. H. M.	Lucknow, India	..	—
Carruthers, V. T., M.B., F.R.C.S.Eng.	Kandy, Ceylon	Officer in charge Military Hospital	—
Casement, F., M.B.	Lucknow, India	..	—
Conyngham, C. A. T., M.B.	Proceeding to India	..	—
Carson, H. W., M.B.	Rawalpindi, India	..	—
Collett, G. G.	Aldershot	On probation	—
Clark, J. A., M.B.	Millbank, London	..	—
Clarke, C., M.B.	Dover	..	—
Cunningham, F. W. M., M.B.	Aldershot	On probation	—
Cane, A. S.	,,	,, ,,	—
Comyn, K.	,,	,, ,,	—
Denyer, C. H.	Calcutta, India	Specialist in Dermatology, 8th Div., and in charge Brig. Laboratory	—
Dickson, H. S.	Proceeding to Gibraltar	..	—
Dawson, G. F., M.B.	Proceeding to India	..	—
Dickenson, R. F. O'T.	Poona, India	..	b.
Dowling, F. T., M.B.	Rawalpindi, India	..	—
Dunn, W. J., M.B.	Proceeding to India	..	—
Dalgleish, F. B.	,, ,,	..	—
Dickson, R. M., M.B.	Glasgow	..	—
Davis, A. H. T.	Bangalore, India	..	—
Dykes, S. S., M.B.	Edinburgh	..	—
Dive, G. H.	Aldershot	On probation	—

Name.	Station.	Appointment.	Specialist Certificates in
Dickson, T. H., M.B. ..	Aldershot	On probation	—
Davies, R. M., M.B. ..	,, ...	,, ,, ...	—
Elliot, E. J., M.B. ..	Tientsin, N. China ..	Officer in charge Military Hospital	—
Elliott, A. C., M.B. ..	Sialkot, India	.. ..	—
Ellcome, J. E.	Fort Tregantle	Officer in charge Military Hospital	—
Eves, T. S., M.B... ..	Proceeding to India ..	.. .. :	
Elvery, P. G. M... ..	Curragh	.. ..	—
Edwards, H. R.	Aldershot	.. ..	—
Forsyth, W. H., M.B. ..	Middelburg, C.C., S. Africa	.. ..	—
Foster, J. R.	Mhow, India	.. ..	—
Fraser, A. D., M.B. ..	.. ..	Seconded under Colonial Office ..	—
Fortescue, A., M.B. ..	Lucknow, India	.. ..	—
Field, S.	Somaliland	.. ..	—
Farebrother, H. W. ..	Malappuram, India ..	Officer in charge Military Hospital	—
Foster, A. L.	Proceeding to India ..	.. ..	—
Fraser, A. E. G.	Cairo, Egypt	.. ..	—
Franklin, C. L., M.B. ..	Manchester	Officer in charge Military Hospital	—
Field, P. C.	Aldershot	On probation	—
Gibbon, E., M.B. ..	Cairo, Egypt	.. ..	—
Galgey, R. C.	Up Park Camp, Jamaica..	.. ..	—
Gibson, H. G.	Valletta, Malta	.. ..	—
Gurley, J. H.	Alexandria, Egypt ..	.. ..	—
Gibson, H...	Proceeding to India ..	.. ..	—
Gregg, R. G. S., M.B. ..	Lucknow, India	.. ..	b.
Grant, J. F., M.B. ..	,, ,, ...	.. ..	—
Gall, H.	Dover	.. ..	—
Goodwin, B. G.	.. ..	On probation	—
Gale, R., M.B.	Aldershot	,, ,, ...	—
Heslop, A. H., M.B. ..	Sialkot, India	.. ..	—
Howell, H. L.	Ahmednagar, India ..	.. ..	—
Hart, J. C., M.B... ..	Tientsin, N. China ..	.. ..	—
Hanafin, J. B., F.R.C.S.I.	Proceeding to India ..	.. ..	—
Hingston, J. C. L. ..	Edinburgh..	Training Special Reserve, R.A.M.C.	—
Hart, H. P., M.B. ..	Woolwich	Anæsthetist	—
Hendry, A., M.B. ..	Poona, India	.. ..	—
Harding, C. E. L., M.B.	,, ,, ...	.. ..	—
Houston, J. W., M.B. ..	Proceeding to India ..	.. ..	—
Hewson, F. M.	,, ,, ..	.. ..	—
Hill, J. R., M.B... ..	Preston	.. ..	—
Hayes, L. C., M.B. ..	.. ..	On probation	—
Hutchinson, V. P. ..	Aldershot	,, ...	—
Johnson, B.	Wellington, India ..	.. ..	—
Jacob, A. H.	Rawalpindi, India ..	.. ..	—
Jones, A. E. B., M.D. ..	Canterbury	.. ..	—
James, J., M.B.	Woolwich	.. ..	—
Jones, J. B., M.B. ..	Londonderry	.. ..	—
Joynt, H. F., M.B. ..	Hounslow	Officer in charge Heath Hospital	—
Jones, A. G., M.B. ..	Aldershot	On probation	—
Kelly, C., M.B.	Secunderabad, India ..	.. ..	—
Kavanagh, E. J., M.B. ..	Bareilly, India	.. ..	—
King, R. de V.	Rawalpindi, India ..	.. ..	—
Keane, G. J., M.D. ..	Uganda	Seconded under Colonial Office ..	b. p.
Kyle, S. W., M.B. ..	Enniskillen	.. ..	—
Kinkead, R. C. G. M., M.B.	Aldershot	On probation	—
Lathbury, E. B.	Nasirabad, India	.. ..	—
Leslie, R. W. D.	Forrest, Malta	.. ..	—
Lochrin, M. J.	Bangalore, India	.. ..	—
Lunn, W. E. C., M.B. ..	Lahore Cantonment, India	.. ..	—
Loughnan, W. F. M. ..	Bareilly, India	Officer in charge Brigade Laboratory, Specialist in Prevention of Disease.	b.
Leahy, M. P., M.B. ..	India	.. ..	—
Langrishe, J. du P., M.B.	Mhow, India	Attached to 6th Dragoons for Antityphoid Treatment	—

Name.	Station.	Appointment.	Specialist Certificates in
Lloyd, J. R.	Poona, India		—
Leckie, M...	Proceeding to India		—
Leeson, H. H.	Woolwich		—
Lane, J. W., M.D.	Dublin	Anæsthetist	—
Lambkin, E. C., M.B.	Caterham		—
Laing, F. R., M.B.		On probation	—
Mitchell, W., M.B.	Sabathu, India		—
McCarthy, D. T., M.B.	Meerut, India		—
Mackenzie, D. F., M.B.	Lebong, India		p.
Middleton, E. M...	Kuldana, India		—
McEwen, O. R.	Murree, India		—
McGrigor, D. B., M.B.	Quetta, India		—
Murphy, L.	Proceeding to India		—
McQueen, C.	S. Africa		—
McCombe, J. S., M.B.	Proceeding to India		—
Marshall, W. E., M.B.		Seconded with the Egyptian Army	—
McCreery, A. T. J., M.B.	Netley		—
McNeill, A. N. R., M.B.	Ayr	Officer in charge Military Hospital	—
Mitchell, T. J., M.B.	Aberdeen	,, ,, ,, ,,	—
McArthur, D. H. C., M.B.	London		—
Manifold, J. A., M.B.	Piershill and Leith Fort	Officer in charge Troops	—
McArthur, W. P., M.B.		On probation	—
McSheehy, O. W., M.B.	Fort Tregantle		—
Mathieson, W.	Aldershot	On probation	—
Nicholls, T. B., M.B.	Hilsea		—
Nolan, R. H.	Aldershot	On probation	—
Nicol, C. M., M.B.	,,	,,	—
O'Keeffe, J. J., M.B.	Hyderabad, India		—
O'Connor, R. D.	Kasauli, India		—
O'Farrell, W. R.	Cairo	Anæsthetist	—
Odlum, B. A.	Tidworth	Leave	—
O'Brien-Butler, C. P.	Poona, India		—
O'Kelly, R.	Proceeding to India		—
O'Rorke, C. H., M.B.	Kildare		—
O'Riordan, W. H.		On probation	—
O'Connor, A. P., M.B.	Aldershot	,,	—
Phelan, E. C., M.B.	Calcutta, India		—
Purdon, W. B., M.B.	Rangoon, India		—
Perry, H. M. J.	Victoria, S. China		—
Phillips, T. McC., M.B.	Lucknow, India		—
Petit, G.	Proceeding to India		—
Pollard, A. M.	Winchester		—
Parkinson, G. S.	Belfast		—
Pottinger, D. E. C., M.B.	Glencorse	Officer in charge Military Hospital	—
Parsons-Smith, E. M.		On probation	—
Priest, R. C., M.B.	Colchester		—
Paris, R. C.	Netley		—
Robinson, T. T. H., M.B.	Mhow, India		—
Rudkin, G. F.	Wellington, India		—
Renshaw, J. A.	Rawalpindi, India		—
Rigby, C. M.	Proceeding to India		—
Ryles, C., M.B.	,, ,,		—
Ranken, H. S., M.B.	Millbank, London		—
Roche, J. J. D., M.B.	Curragh		—
Rennie, W. B., M.B.	Aldershot		—
Robertson, H. G., M.B.	Aldershot	On probation	—
Stevenson, G. H., M.B.	Ambala, India		—
Spencer, J. H., M.B.	Gibraltar		—
Sim, J. A. B., M.B.	Warwick Camp, Bermuda	Officer in charge Troops	
Scaife, C., M.D.	Khandalla, India	Officer in charge Military Hospital	b.
Scott, T. H., M.B.	Dalhousie, India		—
Stuart, F. J., M. B.	Proceeding to India		—
Spong, W. A., M.B.	Quetta, India		—
Suhr, A. C. H., M.B.	R.A.M. College		—

Name.	Station.	Appointment.	Specialist Certificates in
Stevenson, A. L., M.B.	Dublin	..	—
Shepherd, A., M.B.	Proceeding to India	..	—
Saunders, S. M.	Woolwich	..	—
Sherlock, C. G., M.D.	Dublin	..	—
Startin, J.	Deepcut and Blackdown	..	—
Somers-Gardner, F. H., M.B.	Cosham	..	—
Stack, G. H., M.B.	Ewshott	Officer in charge Detention Hosp.	—
Stirling, A. D., M.B.	Ashton	Officer in charge Military Hospital	—
Stallybrass, T. W., M.B.	Aldershot	On probation	—
Stanley, H. V., M.B.	,,	,,	—
Stoney, E. C., M.B.	,,	,,	—
Thompson, W. I., M.B.	Naini Tal, India	..	—
Turner, F. T.	Poona, India	..	—
Todd, R. E., M.B.	Proceeding to Egypt	..	—
Treves, H. T.	Uganda	Seconded under Colonial Office	—
Tobin, W. J.	Proceeding to India	..	—
Tomlinson, P. S.	Birmingham	..	—
Taylor, G. P., M.B.	Glasgow	..	—
Varvill, B.	Proceeding to India	..	—
Vaughan, E. V., M.B.	Queenstown	..	—
Wood, J. L.	Bareilly, India	Staff-Surgeon	—
Wilson, M. O., M.B.	Hyderabad, India	..	—
Wells, A. G.	Lahore, India	..	—
Worthington, F.	Colchester	With Special Reserves	—
Walker, S. G., M.B.	Proceeding to India	..	—
Wright, W. G.	Netley	..	—
Wright, A. R., M.B.	Bordon	..	—
White, M., M.B.	Aldershot	..	—
Williamson, M. J., M.B.	Bulford	..	—
Winder, A. S. M., M.B.	Curragh	..	—
Weddell, J. M.	Aldershot	On probation	—
Yourell, J. R., M.B.	Enniskillen	Officer in charge Military Hospital	—

MEDICAL OFFICERS OF THE HOUSEHOLD CAVALRY.

Rank.	Name.	Regiment.	Specialist Certificates in
Surg.-Lieutenant-Colonel	Deeble, B. W. C.	1st Life Guards	—
Surgeon-Major	Power, J. H.	2nd Life Guards	—
,, ,,	Pares, B.	Royal Horse Guards	—
Surgeon-Captain	Cowie, R. M.	2nd Life Guards	—
,, ,,	Bodington, P. J., M.B.	Royal Horse Guards	—
,, ,,	Lupton, A. C., M.B.	1st Life Guards	—

MEDICAL OFFICERS OF THE BRIGADE OF GUARDS.

Surg.-Lieutenant-Colonel	Crooke-Lawless, W. R., M.D., C.I.E.	Coldstream Guards	On Staff of Viceroy of India	—
,, ,, ,,	Bateson, J. F., M.B.	,, ,,	Windsor	—
Surgeon-Major	Whiston, P. H.	Irish Guards	Caterham	b.

QUARTERMASTERS.

Rank.	Name.	Present Station.	Date of last arrival home or embarkation for Abroad
Hon. Major	Merritt, G.	Cape Town, S. Africa	24 12 1904
,, ,,	Beach, J. H. W.	London	2 5 1903
,, ,,	Hirst, J.	Cosham	30 8 1902
,, ,,	Lines, E.	Darlington	21 10 1907
,, ,,	Crawley, C.	On leave	— 12 1909
,, ,,	Brake, T F.	Dublin	22 5 1902

Rank		Name.	Present Station.	Date of last arrival home or embarkation for Abroad.
Hon.	Major	Short, J. B.	London	13 6 1907
,,	Capt.	Hasell, H. G.	Lichfield	13 12 1902
,,	,,	Allen, G. L.	Curragh	9 3 1908
,,	Major	Bruce, A.	Woolwich	12 2 1904
,,	Capt.	Whitehorn, J. C. B.	Cork	24 3 1903
,,	,,	Painton, G. H.	London	13 9 1902
,,	,,	Brook, H. S.	Edinburgh	16 4 1909
,,	,,	Spackman, H.	Returning to England, tour expired	17 11 1905
,,	,,	Chalk, A. J.	Egypt	1 10 1909
,,	,,	Green, J.	Malta	19 2 1908
,,	,,	Talbot, W. J. C.	York	27 12 1902
,,	,,	Essex, B. E.	Egypt	8 1 1907
,,	,,	McClay, J.	Woolwich	31 1 1905
,,	,,	Short, G. F.	Dublin	11 3 1908
,,	,,	Woolley, H.	Dover	9 3 1908
,,	Lieut.	Hall, F. W.	Aldershot	6 12 1902
,,	,,	Morrison, A.	On leave	24 9 1907
,,	,,	Attwood, J.	Cosham	13 12 1902
,,	,,	Duncan, W.	Devonport	18 9 1902
,,	,,	[1] Bruce, F.	Dublin	19 11 1900
,,	,,	Holway, W. G.	Woolwich	1 4 1908
,,	,,	Offord, E. P.	Gibraltar	13 2 1908
,,	,,	Audus, H. J. F.	Aldershot	11 3 1900
,,	,,	Conolly, J. B.	S. Africa	27 11 1907
,,	,,	Houghton, E.	(For S. Africa)	6 12 1902
,,	,,	Scott, R.	Netley	21 10 1907
,,	,,	Wilson, A.	Devonport	29 1 1908
,,	,,	Glover, H. W.	Aldershot	6 5 1901
,,	,,	Exton, T.	Tidworth	29 8 1902
,,	Captain	Crookes, F.	Devonport	10 12 1904
,,	Lieut.	Cowan, R. R.	Shorncliffe	19 12 1903
,,	,,	Benson, G. A.	N. China	31 10 1907
,,	,,	Wakefield, H. P.	Southampton	15 4 1905
,,	,,	Wheeler, A.	Depôt	10 2 1905
,,	,,	Pilgrim, A. J.	Malta	24 9 1907
,,	,,	Lunney, A.	Tidworth	10 2 1905
,,	,,	Clapshaw, A.	(For S. Africa)	2 10 1902
,,	,,	Archibald, W. N.	Colchester	14 2 1908
,,	,,	Watkins, J.	Chester	15 4 1905
,,	,,	Gillman, J.	Netley	15 4 1905
,,	,,	Cope, T. F.	S. Africa	23 10 1909
,,	,,	Osborne, J. W.	Returning to England, tour expired	27 5 1895
,,	,,	Saunders, E. V.	Hong Kong	4 12 1909
,,	,,	Wilson, J.	War Office	14 6 1885

[1] Specialist Certificate in Skiagraphy.

RETIRED MEDICAL OFFICERS OF THE REGULAR ARMY WHO ARE EMPLOYED.

Name.	Station where Employed.
Lieut.-Col. A. G. Kay, M.B.	Clifton, Bristol.
Lieut.-Col. W. Keays	Weymouth.
Lieut.-Col. H. H. Stokes, M.D.	Oxford.
Capt. H. Cotton	Ipswich.
Lieut.-Col. J. G. Williamson	Leicester.
Lieut.-Col. J. A. Gormley, M.D.	Kingston.
Col. A. L. Browne, M.D.	Taunton.
Lieut.-Col. H. Scott, M.B.	London.
Col. W. A. Parker	Penally.
Lieut.-Col. L. B. Ward	Coventry.
Lieut.-Col. W. Finlay	Jersey.
Lieut.-Col. H. Charlesworth, C.M.G.	Nottingham.

Name.	Station where Employed.
Lieut.-Col. G. F. Poynder	Bedford.
Lieut.-Col. H. L. Battersby	Bodmin.
Lieut.-Col. C. G. D. Mosse, F.R.C.S.I.	Guernsey.
Major H. S. Peeke	Derby.
Major J. F. Burke	Lancaster.
Lieut.-Col. T. B. A. Tuckey	Detention Barracks, York.
Lieut.-Col. W. G. Clements	Christchurch.
Lieut.-Col. A. Baird, M.B.	Worcester.
Lieut.-Col. J. Riordan, M.B.	Clonmel.
Major E. H. Myles, M.B.	Guernsey.
Surg.-Lieut.-Col. G. S. Robinson	Eastbourne.
Major S. Butterworth	Carlisle.
Lieut.-Col. G. T. Trewman	Reading.
Lieut.-Col. J. Osburne	Galway.
Lieut.-Col. E. M. Wilson, C.B., C.M.G., D.S.O.	Record Office, Aldershot.
Major A. E. C. Spence, M.B.	Warwick.
Major B. F. Zimmermann	Topsham, Exeter.
Major R. J. McCormack, M.D.	Omagh.
Major R. I. Power	Waterford.
Lieut.-Col. T. Archer	Lydd.
Lieut.-Col. U. J. Bourke, M.B.	Hamilton.
Lieut.-Col. G. E. Moffet, M.B.	Perth.
Lieut.-Col. F. J. Greig	Stirling.
Lieut.-Col. J. Kearney, M.D.	Wrexham.
Lieut.-Col. T. H. Corkery	Exeter.
Lieut.-Col. R. W. Barnes	Dorchester.
Lieut.-Col. M. J. Whitty, M.D.	Liverpool.
Lieut.-Col. J. M. Nicolls, M.B.	Detention Barracks, Cork.
Lieut.-Col. W. S. Dowman	Northampton.
Major G. A. Wade	Horfield.
Major C. W. Allport, M.D.	Great Yarmouth.
Lieut.-Col. C. R. Woods, M.D.	Birr.
Major A. Wright	Falmouth.
Lieut.-Col. A. W. Browne	Armagh.
Major V. H. W. Davoren	Bury St. Edmunds.
Major H. V. Dillon	Scarborough.
Lieut.-Col. A. Hosie	Sandown.
Major J. D. Moir	Fort Efford and Mutley District.
Lieut.-Col. G. Coutts	Chichester.
Major W. J. Trotter	Naas.
Lieut.-Col. W. Rowney, M.D.	Manchester.
Lieut.-Col. A. De C. Scanlan	Guildford.
Major C. W. Duggan	Lincoln.
Colonel J. Magill, C.B., M.D.	Staff-Officer to A.M.O., 2nd London Division Territorial Force.
Lieut.-Col. J. D. T. Reckitt	Staff-Officer to A.M.O., 1st London Division Territorial Force.
Lieut.-Col. E. O. Wight	Staff-Officer to A.M.O., Home Counties Division Territorial Force.
Major E. C. Freeman, M.D.	Staff-Officer to A.M.O., East Anglian Division Territorial Force.
Lieut. Col. G. Scott, M.B.	Staff-Officer to A.M.O., Highland Division Territorial Force.
Lieut.-Col. L. Haywood, M.B.	Staff-Officer to A.M.O., South Midland Division Territorial Force.
Lieut.-Col. D. L. Irvine	Staff-Officer to A.M.O., North Midland Division Territorial Force.
Colonel C. A. Webb	Staff-Officer to A.M.O., Wessex Division Territorial Force.

JOURNAL

OF THE

ROYAL ARMY MEDICAL CORPS.

Corps News.

JANUARY, 1910.

ARMY MEDICAL SERVICE.

Surgeon-General William Donovan, C.B., retires on retired pay, dated November 17, 1909.

Colonel Owen E. P. Lloyd V.C., to be Surgeon-General, *vice* W. Donovan, C.B., retired, dated November 17, 1909.

Brevet-Colonel Tom P. Woodhouse, from the Royal Army Medical Corps, to be Colonel, *vice* O. E. P. Lloyd, V.C., dated November 17, 1909.

Surgeon-General William L. Gubbins, C.B., M.V.O., M.B., Deputy-Director-General, Army Medical Service, to be an Honorary Surgeon to the King, *vice* Brigade-Surgeon-Lieutenant-Colonel and Brevet-Colonel C. E. Harrison, C.V.O., M.B., retired, dated October 19, 1909.

ROYAL ARMY MEDICAL CORPS.

Lieutenant Colin Cassidy is seconded for Service with the Egyptian Army, dated October 14, 1909.

Lieutenant-Colonel Robert D. Hodson is placed on retired pay, dated December 14, 1909.

The undermentioned Quartermasters, Royal Army Medical Corps, are placed on retired pay: Honorary Captain Edward Percy Moss, dated November 20, 1909; Honorary Lieutenant John Glennon, dated December 13, 1909.

Serjeant-Major John Wilson to be Quartermaster, with the honorary rank of Lieutenant, *vice* Honorary Captain E. P. Moss, dated November 20, 1909.

The undermentioned Quartermasters and Honorary Lieutenants are granted the honorary rank of Captain: Alfred J. Chalk, John Green, William J. C. Talbot, and Edward P. Moss, dated November 18, 1909; Bertram E. Essex, John McClay, and George F. Short, dated December 6, 1909; Henry Woolley, dated December 13, 1909.

INCREASED PAY.—Lieutenant-Colonels J. M. Reid and T. B. Winter have been selected for increased pay.

TRANSFERS.—Colonel T. P. Woodhouse, from the Southern to the Scottish Command; Captain J. F. Martin, from the Eastern Command to the Royal Military College, Sandhurst; Major H. V. Dillon, R.P., from the Southern to the Northern Command.

TRANSFERRED TO HOME ESTABLISHMENT.—Major H. Hewetson.

ARRIVALS HOME FOR DUTY.—From India: Lieutenant-Colonels F. J. Jencken, M.B., C. T. Blackwell, M.D., and F. S. Le Quesne, V.C.; Majors H. E. Winter, J. W. Jennings, D.S.O., F. Kiddle, M.B., and W. E. Hudleston; Captains R. H. McNichol, M.B., S. L. Pallant, F. J. Turner, and W. Wiley, M.B.

EMBARKATIONS.—For Egypt: Colonel T. M. Corker, M.D.; Captain E. E. Ellery and Lieutenant R. E. Todd. For India: Lieutenant-Colonels C. E. Nichol, D.S.O., M.B., J. V. Salvage, M.D., and R. H. Penton, D.S.O.; Majors J. Ritchie, M.B., E. M. Hassard, R. F. E. Austin, and L. F. Smith, M.B.; Captains E. P. Hewitt, J. H. R. Bond, E. G. Ford, M.B., J. G. Churton, and R. T. Brown, M.D.; Lieutenants G. F. Dawson, M.B., and H. V. B. Byatt. For Jamaica: Captain W. M. Power.
Quartermaster and Honorary Lieutenant E. V. Saunders embarked for Hong-Kong on December 4, 1909.

POSTINGS.—Southern Command: Lieutenant-Colonel F. J. Jencken, M.B., Major W. E. Hudleston, and Captain W. Wiley, M.B. Eastern Command: Lieutenant-Colonels C. T. Blackwell, M.D., and F. S. Le Quesne, V.C.; Majors H. E. Winter and H. Hewetson; Captain S. L. Pallant. Western Command: Major J. W. Jennings, D.S.O. Royal Hospital, Chelsea: Major F. Kiddle, M.B. Scottish Command: Captains R. H. McNichol, M.B., and F. J. Turner.

APPOINTMENTS.—Captain J. F. Martin, Assistant Surgeon Royal Military College, Sandhurst; Captain C. H. Carr, Specialist Dental Surgery, Salisbury Plain; Lieutenant-Colonel T. J. R. Lucas, C.B., to be an Administrative Medical Officer in India on promotion; Lieutenant-Colonel M. T. Yarr, Medical Inspector of Recruits, Scottish Command; Lieutenant-Colonel R. Porter, Principal Medical Officer, Western Command, on promotion; Lieutenant-Colonel J. J. Gerrard, M.B., has been appointed Medical Inspector of Recruits in the Northern and not Scottish Command as previously stated; Major H. V. Dillon, R.P., Medical Charge, Scarborough, from Trowbridge.

QUALIFICATIONS.—Captain O. W. A. Elsner, R.A.M.C., has obtained the Diploma of Public Health of the Royal College of Physicians and Surgeons, Ireland.
Captain M. W. Faulkner, R.A.M.C., has obtained the Fellowship of the Royal College of Surgeons, Ireland.

His Majesty the King of Italy has conferred the following Orders upon the officers named, in recognition of services rendered by them in connection with the earthquake at Messina in 1908:—
To be a Commander of the Order of the Crown of Italy, Major G. S. Crawford, R.A.M.C.
The Order of the Crown of Italy, Captains P. A. Lloyd-Jones, H. S. Anderson, and H. C. Winckworth, R.A.M.C.; Surgeon-Captain R. Randon, Royal Malta Artillery.

DISTRIBUTION OF SELECTED LIEUTENANT-COLONELS, ROYAL ARMY MEDICAL CORPS.

The following, which has been communicated by the Director-General, Army Medical Service, is published for general information:—
The allotment of selected Lieutenant-Colonels will in future and under ordinary circumstances be as follows:—

HOME.

Aldershot Command (4).—Cambridge Hospital, Connaught Hospital, Royal Army Medical Corps School of Instruction, Bordon.

Eastern Command (5).—Charge of Royal Herbert Hospital, Woolwich,[1] and the Military Hospitals at Chatham, Colchester, Dover, Shorncliffe.

Irish Command (4).—Charge of Royal Infirmary, Dublin, and the Military Hospitals at Cork and Curragh, and Administrative Medical Officer at Belfast.

London District (2).—Senior Medical Officer Recruiting, Charge of Queen Alexandra Military Hospital.

Northern Command (1).—Charge of Military Hospital, York.

Scottish Command (1).—Charge of Military Hospital, Edinburgh.

Southern Command (4).—Charge of Military Hospitals at Cosham, Devonport, Netley, Tidworth.

Western Command (1).—Charge of Military Hospital, Chester.

Colonies (8).—Viz.: Gibraltar, Malta, Egypt, Mauritius, Singapore, North China, one each, and South Africa, two. India and Miscellaneous (21). Total, 51.

The following Retired Pay appointments are vacant: Landguard Fort, Belfast (Recruiting Medical Officer), Trowbridge, Netheravon.

The medical charge of troops at Netheravon has been converted into an appointment for a retired officer.

RESULTS OF EXAMINATION OF LIEUTENANTS, ROYAL ARMY MEDICAL CORPS.

The following results of examinations are notified for general information:—

Passed in (*h*) i for rank of Captain: G. H. Stevenson, M.B., H. W. Farebrother, F. T. Turner, A. G. Wells, T. W. Browne.

DISTRIBUTION OF THE LIEUTENANTS ON PROBATION, ROYAL ARMY MEDICAL CORPS, SECOND JUNIOR COURSE, 1909.

Aldershot Command.—Lieutenants G. G. Collett, R. H. Nolan, and P. C. Field.

Eastern Command.—Lieutenants H. R. Edwards, W. Mathison, K. Comyn, C. M. Nicol, E. C. Stoney, A. P. O'Connor, and R. M. Davies.

Irish Command.—Lieutenants F. W. M. Cunningham, T. H. Dickson, R. C. G. M. Kinkead, and H. V. Stanley.

Southern Command.—Lieutenants A. G. Jones, J. M. Weddell, V. P. Hutchinson, and T. W. Stallybrass.

Northern Command.—Lieutenant H. G. Robertson.

London District.—Lieutenants G. H. Dive, R. Gale, and A. S. Cane.

PROMOTIONS.

To be Serjeant-Major.—10339 Quartermaster-Serjeant F. O. Chappell, November 24, 1909, *vice* W. H. Bellingham, to pension.

To be Staff-Serjeant.—10721 Serjeant A. Smith, October 15, 1909, *vice* H. J. Power, to pension; 10560 Lance-Serjeant A. Gibbons, November 22, 1909, *vice* J. R. Sainty, to pension (special for services rendered in connection with the Sleeping Sickness Commission in Uganda).

To be Serjeant.—4671 Private T. Dent, November 25, 1909, special as Serjeant Master-Tailor.

APPOINTMENTS.

19543 Private F. E. H. Audas, November 2, 1909, appointed Lance-Corporal, special under para. 281, S.O. for R.A.M.C.; 103 Private G. P. Steer, November 2, 1909, appointed Lance-Corporal, special under para. 281, S.O. for R.A.M.C.; 19980 Private H. J. Loder, November 29, 1909, appointed Lance-Corporal, special under para. 281, S.O. for R.A.M.C.; 19732 Private H. Mayes, November 23, 1909, appointed Lance-Corporal, special under para. 281, S.O. for R.A.M.C.; 19618 Private P. Bettison, December 6, 1909, appointed Lance-Corporal, special under para. 281, S.O. for R.A.M.C.

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[1] Also at present acts as Administrative Medical Officer.

Casualties.

Discharges.—6302 Serjeant-Major W. H. Bellingham, November 23, 1909, to pension; 5810 Serjeant-Major C. A. Barton, December 12, 1909, to pension; 8210 Staff-Serjeant J. R. Sainty, November 21, 1909, termination of second period; 3534 Staff-Serjeant W. Brodie, November 18, 1909, having reached the age; 8300 Staff-Serjeant J. W. Cook, December 14, 1909, medically unfit; 8367 Staff-Serjeant A. E. Ford, December 15, 1909, after eighteen years' service; 8529 Serjeant J. Rye, November 24, 1909, after eighteen years' service; 4615 Private J. A. Morrison, November 15, 1909, on payment of £10; 4528 Private A. Cooke, November 13, 1909, on payment of £10; 1739 Private P. L. De Jongh, December 18, 1909, medically unfit.

Transfers to Army Reserve.—944 Private H. J. Westlake, November 9, 1909; 16471 Corporal E. Collins, November 12, 1909; 16501 Private E. Tyler, November 11, 1909; 16506 Private C. Lark, November 15, 1909; 18212 Private J. Mason, November 14, 1909; 16503 Private A. McKinley, November 13, 1909; 16496 Private J. W. Faulkner, November 14, 1909; 16525 Private F. Wooding, November 17, 1909; 16500 Private E. Wynne, November 17, 1909; 17679 Private A. Hockley, November 19, 1909; 965 Private E. S. Tear, November 15, 1909; 16570 Private J. L. Kerr, November 19, 1909; 16567 Private C. D. Brown, November 18, 1909; 980 Private H. Stubbs, November 19, 1909; 972 Private S. Cox, November 19, 1909; 16504 Private H. McCrory, November 17, 1909; 976 Private A. E. Love, November 18, 1909; 16559 Private W. H. Green, November 19, 1909; 995 Private P. C. George, November 20, 1909; 16574 Private W. Watson, November 21, 1909; 16666 Private W. J. McConaghie, November 24, 1909; 998 Private W. J. Rawlings, November 23, 1909; 999 Private A. H. Philpotts, November 23, 1909; 16675 Private J. Fullalove, November 28, 1909; 1203 Private A. W. Fower-aker, November 30, 1909; 1010 Private J. Linn, November 29, 1909; 16572 Private H. Blackey, November 21, 1909; 16676 Private J. Anderson, November 28, 1909; 16677 Corporal C. McDonald, November 24, 1909; 1080 Private J. H. Humphreys, November 26, 1909; 16669 Private A. Lloyd, November 25, 1909; 1014 Private W. Weber, November 26, 1909; 16670 Private W. Maddocks, November 25, 1909; 16578 Private W. W. Tait, November 24, 1909; 16737 Private E. Nevard, November 27, 1909; 1020 Private A. J. Aldridge, November 30, 1909; 1009 Private R. B. Tutton, November 28, 1909; 1019 Private W. E. J. Stansell, November 30, 1909; 16754 Private W. Peto, December 5, 1909; 16764 Private J. Abrahams, December 3, 1909; 1040 Private W. C. Peakall, December 3, 1909; 1042 Private H. Yates, December 4, 1909 16829 Private D. Carey, December 3, 1909; 16744 Private A. Green, December 2, 1909; 1024 Private H. W. Newman, December 2, 1909; 16763 Private S. Roberts, December 2, 1909; 1030 Private W. O'Regan, December 5, 1909; 1045 Private W. Wright, December 6, 1909; 16766 Private W. Hay, December 4, 1909; 16830 Private T. Wallworth, December 5, 1909; 16833 Private J. Hunt, December 8, 1909; 1053 Private G. O. Sainz, December 10, 1909; 16758 Private J. F. Benfield, December 9, 1909; 16832 Private W. G. Burt, December 8, 1909; 16818 Private R. Keech, December 8, 1909; 16835 Private J. Ferris, December 11, 1909; 1061 Private J. F. McSweeney, December 13, 1909; 16850 Private W. J. Denning, December 15, 1909.

Transfers to other Corps.—4336 Private C. Green, November 10, 1909, to Royal Marines Light Infantry; 4303 Private J. Walsh, November 17, 1909, to Royal Scots; 1959 Private C. E. Bacon, November 19, 1909, to Leicester Regiment; 10721 Serjeant A. Smith, November 16, 1909, to E. A. Field Ambulance; 11146 Serjeant E. Wing, November 18, 1909, to South Wales Mounted Brigade, Field Artillery; 9578 Serjeant W. Dawson, December 1, 1909, to South Midland Division, Territorial Force.

Transfers from other Corps.

4661 Private T. Smith, October 18, 1909, from Coldstream Guards; 4677 Private E. Marsh, October 12, 1909, from Middlesex Regiment; 4678 Private A. J. Harvey, October 23, 1909, from Royal Field Artillery; 4683 Private F. Hanlon, November 20, 1909, from Royal Dublin Fusiliers; 4696 Private A. E. Phillips, December 2, 1909, from East Surrey Regiment.

Embarkations for Abroad.

To Jamaica, per ss. "Oratava," November 18, 1909.—17734 Private A. R. Cooke, 19037 Private W. B. Thomas, 19570 Private W. Fisher, 291 Private F. Milton, 1521 Private T. A. Palmer, 1612 Private W. Boyd, 16155 Private G. Clark.

Disembarkations from Abroad.

From Gibraltar, per H.M.S. "Canopus," November 23, 1909.—17155 Private J. Riggs.

From Malta, per ss. "Maine," invalided, December 2, 1909.—18777 Private W. Aylett.

The following N.C.O's and Men have qualified for Promotion in the various Corps Examinations.

For Quartermaster-Serjeant.—9890 Staff-Serjeant C. Perry, 11123 Staff-Serjeant H. J. Polhill, 10221 Staff-Serjeant E. Larner, 11225 Staff-Serjeant A. Bennett.

For Staff-Serjeant.—10581 Serjeant H. Warsop, 12158 Serjeant E. J. Strange, 14973 Serjeant E. Lacy, 10542 Serjeant A. E. Mendel, 12582 Serjeant J. Whiting.

For Serjeant.—13814 Corporal P. Kenneally, 17928 Corporal W. G. Toye, 12053 Corporal W. Ross, 18645 Lance-Serjeant C. E. Rouse, 11734 Corporal A. H. O. Campion, 18385 Lance-Serjeant F. W. Coupland, 12461 Corporal P. F. Cook, 10808 Corporal H. S. Burden, 18018 Corporal F. G. Phipps, 14924 Corporal J. G. A. Forbes.

For Corporal. — 168 Private T. J. Watkins, 17960 Private T. McGuire, 12385 Private E. A. Rayner, 18374 Private A. Burke, 1798 Private R. R. Gilbert, 12245 Private C. F. Pinney, 18152 Private J. Oswald, 19986 Private W. H. Gardner, 17699 Private C. Morrall, 1713 Private F. B. McCarthy, 19688 Private T. V. Falkingham, 127 Private S. W. Bull, 2235 Private T. Walkley, 17506 Private P. Blong, 18873 Private W. J. Spiers, 19267 Private J. Peacock, 1731 Private C. Northcott, 1757 Private W. J. Marshall, 1799 Private S. A. Stowe, 1905 Private J. G. Eves, 2137 Private F. Crack, 19031 Private J. Leaky, 16762 Private F. Price, 14452 Private F. Godfrey, 18929 Private G. W. Taylor, 18219 Private D. J. Robertson.

Passed as Dispensers.—15238 Corporal J. T. Wrigglesworth, 19732 Private H. Mayes, 15671 Corporal R. W. Cole, 19469 Private H. D. Purnell, 19805 Private J. Hanrahan, 18576 Corporal W. Lamkin, 19256 Private W. King, 247 Private T. J. Doyle.

NOTES FROM THE LONDON DISTRICT:—

Conversazione at the Royal Army Medical College.

A very successful conversazione took place at the Royal Army Medical College on the evening of Tuesday, December 14. The guests were received by the Director-General and Lady Keogh. The whole of the reception rooms of the mess were thrown open and were effectively decorated. Refreshments were served in the messroom, where a detachment of the Royal Army Medical Corps Band played an excellent selection of music in the band gallery. The new covered passage between the mess and the College was prettily decorated with flowers and palms. The following demonstrations and exhibits were shown in the various rooms in the College, and excited the greatest interest:—

Room 1.—(1) Methods of sterilisation of water: (*a*) Filtration, with an exhibition of filters from some of the earliest patterns; (*b*) heat sterilisation; (*c*) chemical sterilisation. (2) Foods: (*a*) Soldiers' rations in the field; (*b*) emergency rations; (*c*) dried foods, &c.; (*d*) preservatives and adulteration of foods. Lieutenant-Colonel C. H. Melville, Major C. F. Wanhill, Captain H. B. Fawcus.

Room 2.—(3) X-ray apparatus—screen demonstration. Major C. G. Spencer.

Room 3.—(4) High-frequency electricity. (5) X-ray apparatus for field use. (6) Skiagram of gunshot injuries. Major C. G. Spencer.

Room 4.—(7) Special media for the isolation of the typhoid bacillus. (8) Reactions of organisms of the colon, typhoid and intermediate groups in sugars. Major C. F. Wanhill, Captain H. B. Fawcus.

Room 5.—(9) Estimation of water in foods by distillation with petroleum. (10) New method of extracting gases from fluid, such as sewage effluents. (11) Weston and Ellis's modification of Kjeldhal's process for estimation of nitrogen. (12) The colouring matter of preserved meats. (13) The Dickinson-Gair gas analysis apparatus. (14) Evaporation under reduced pressure. Major W. W. O. Beveridge, D.S.O.

Room 6.—(15) A food analysis in actual process. (16) Method of sterilisation of tinned meats. (17) Method of ascertaining the temperature reached in the interior of a tin of meat during sterilisation. Major C. F. Wanhill, Major W. W. O. Beveridge, D.S.O.

Room 7.—(18) The life-history of *Ornithodorus moubata*, the transmitter of the tick fever of Africa. Lieutenant-Colonel Sir W. B. Leishman.

Rooms 8 *and* 9.—(19) Demonstration of the technique of opsonic and other blood estimations. Major S. L. Cummins, Lieutenant A. C. H. Suhr.

Room 10.—(20) A series of microscopic and other specimens illustrating the micro-organisms associated with the following diseases: Pneumonia, tuberculosis, tetanus, anthrax, malaria, typhoid fever, leprosy, septicæmia, actinomycosis, sleeping sickness, Malta fever, plague, cholera, cerebro-spinal fever, diphtheria, kala-azar. Lieutenant-Colonel Sir W. B. Leishman, Captain J. C. Kennedy, Lieutenant A. C. H. Surh. (21) Demonstration of the *Entamœba histolytica* of tropical dysentry, showing the development and formation of spores. Captain T. J. Potter.

Room 11.—(22) Demonstration of the preparation and standardisation of anti-typhoid vaccine. Major H. W. Grattan, Captain A. L. A. Webb.

Room 12.—(23) (*a*) Demonstration of spirochætes and trypanosomes with "dark ground" illumination; (*b*) the Bordet-Gengou reaction. Captain L. W. Harrison. (24) A simple method for counting blood cells. Major W. S. Harrison, Captain T. J. Potter.

Room 13.—(25) The action of antimony salts on the trypanosomes of Surra, *in vivo* and *in vitro*. Captain Fry.

Surgical Museum (second floor).—(26) Field medical and surgical equipment. Major C. G. Spencer.

A series of diagrams were hung in the lecture theatre, graphically illustrating the steady improvement in the general health of the army, and the marked reduction of epidemic disease among soldiers during recent years, and the consequent increased efficiency and great financial saving which have been attained.

Between three and four hundred guests accepted invitations, among whom were Lord and Lady Midleton, the members of the Advisory Board, General Sir Ian and Lady Hamilton, Lieutenant-General Sir H. and Lady Miles, Colonel Sir Edward and Lady Ward, the Deans of the London Medical Schools, Sir William and Lady Church, Sir John and Lady Tweedy, the Consulting Staff of the Queen Alexandra Military Hospital, the Examiners of the Royal Army Medical College, Inspector-General Porter, R.N., Sir W. and Lady Allchin, Sir P. and Lady Manson, Sir T. and Lady Barlow, Sir W. and Lady Crooks, and many of the leaders of medical and scientific thought in London. A specially pleasing feature of the entertainment was the presence of a large number of retired members of the Army Medical Service, who have done so much to forward the best interests of their old corps in the past, and to whom the present generation owe a deep debt of gratitude.

The following programme was ably rendered by the band under the conductorship of Mr. G. P. Robertson.

PROGRAMME.

(1)	*March*	"Florentiner"	*Fucik.*
(2)	*Overture*	"Loin du Pays"	*Boullon.*
(3)	*Selection*	"Our Miss Gibbs"	*Monckton.*
(4)	*Valse*	"The Dollar Princess"	*Fall.*
(5)	*Hungarian Dances*		*Brahms.*
(6)	*From the Ballet*—"Coppelia"	(*a*) Mazurka (*b*) Valse de la Poupée (*c*) Czardas	*Delibes.*
(7)	*Valse*	"Unsere Edelknaben"	*Ziehrer.*
(8)	*Selection*	"Tannhäuser"	*Wagner.*
(9)	*Three Dances*	"Henry VIII."	*German.*
(10)	*Spanish Ballet Music*		*Desormes.*
(11)	*Valse*	"Songe d'Automne"	*Joyce.*
(12)	*Selection*	"Patience"	*Sullivan.*

NOTES FROM MALTA.—Captain Gibbon writes: "Since the last notes were written we have got well into the winter's work. On November 4 and 7 the autumn race meeting was held; Lieutenant H. G. Gibson's pony 'Cupid' ran second in the 2nd class Handicap.

"On November 6 the Suffolk Regiment held a boxing competition in the Valletta gymnasium, the chief attraction of the evening being a ten-round contest between Lance-Corporal Gilmour, 3rd Battalion King's Royal Rifle Corps (middle weight champion of Malta, 1908), and Private A. Smith, 30th Company, Royal Army Medical Corps. In the fourth round Smith knocked out his man, amidst well-deserved applause.

"It was very pleasing to us to find a new man like Smith to take the place of Private J. R. Dare, who has gone home, and to uphold the Royal Army Medical Corps in the ring. There will be plenty of opportunities for Smith during the winter months, both with the Regiments and the Mediterranean Fleet Boxing Club.

"During the month we have played two matches in the hockey league, beating the Army Service Corps by one goal to nothing, and suffering defeat at the hands of the Suffolk Regiment by two goals to *nil*.

"The football season began in earnest for us on the 6th instant, when we met the Argyll and Sutherland Highlanders, in our first fixture of the league, and although we were beaten by four goals to one we put up a very good fight, and when our forwards get together we ought to take a lot of beating.

"We are all sorry to lose Lieutenant-Colonel C. Birt, who goes home this week by P. and O. He has been with us now for eight months, investigating pyrexia of uncertain origin, and discovering the breeding-ground of the pappataci. We congratulate Quartermaster-Serjeant F. O. Chappell on promotion to Serjeant-Major, and wish him luck in his new rank."

NOTES FROM CALCUTTA.—Lieutenant-Colonel R. S. F. Henderson, R.A.M.C., Secretary to Principal Medical Officer, H.M.'s Forces in India, writes as follows, dated November 18, 1909:—

"*Leave.*—Following officers have been granted extension of medical certificate leave ex-India:—

"Lieutenant-Colonel J. Battersby from October 2, 1909, to April 1, 1910. Major C. H. Hopkins from October 30, 1909, to April 29, 1910. Captain G. H. Richard from October 26, 1909, to January 24, 1910.

SPECIAL RESERVE OF OFFICERS.

ROYAL ARMY MEDICAL CORPS.

Supplementary List.

The undermentioned to be Lieutenants (on probation):—

George Rollason, dated October 25, 1909; John Fraser, M.B., dated November 1, 1909.

Lieutenant Wilson Ransom to be Captain, dated November 26, 1908.

William Helgrove Leslie McCarthy, M.B., to be Lieutenant (on probation), dated November 17, 1909.

TERRITORIAL FORCE.

ROYAL ARMY MEDICAL CORPS.

3rd Home Counties Field Ambulance.—The appointment of Quartermaster (Quartermaster and Honorary Captain, retired pay), Martin Hewitt is antedated to July 21, 1909.

Hector Graham Gordon Mackenzie, M.B., to be Lieutenant, dated October 20, 1909.

1st North Midland Field Ambulance.—Henry Gray Woodhouse Dawson, M.B., to be Lieutenant, dated October 7, 1909.

1st London (City of London) Sanitary Company.—Lieutenant Ralph H. B. Carthew, M.D., resigns his commission, dated October 14, 1909.

Attached to Units other than Medical Units.

Captain John Rowan, M.B., to be Major, dated December 27, 1908.

ROYAL ARMY MEDICAL CORPS.

Eastern Mounted Brigade Field Ambulance.—Meredith Sedgwick Doubble to be Lieutenant (to be supernumerary), dated October 30, 1909.

London Mounted Brigade Field Ambulance.—Major Martin Alfred Cooke, from the List of officers attached to Units other than Medical Units, to be Major, dated June 20, 1909.

3rd Wessex Field Ambulance.—Herbert Larman to be Transport Officer, with the honorary rank of Lieutenant, dated October 4, 1909.

Attached to Units other than Medical Units.

Lieutenant-Colonel and Honorary Surgeon-Colonel Robert L. Sparrow resigns his commission, and is granted permission to retain his rank and to wear the prescribed uniform, dated October 31, 1909.

Highland Mounted Brigade Field Ambulance.—John Macpherson Grant, M.D., to be Lieutenant, dated October 19, 1909.

3rd London (City of London) Field Ambulance.—Lieutenant George L. L. Lawson to be Captain, dated August 22nd, 1909.

INFANTRY.

5th Battalion, the Lincolnshire Regiment.—Surgeon-Captain John W. Nicholson to be promoted Surgeon-Major, dated January 28, 1909.

ROYAL ARMY MEDICAL CORPS.

3rd North Midland Field Ambulance.—Lieutenant George J. S. Atkinson resigns his commission, dated October 23, 1909.

Attached to Units other than Medical Units.

Captain James H. Hunter, M.D., resigns his commission, dated October 15, 1909.

2nd South Midland Brigade.—Surgeon-Lieutenant George Mackie to be Surgeon-Captain, dated August 24, 1909.

2nd Home Counties Field Ambulance.—James Dundas, M.B., to be Lieutenant, dated October 20, 1909.

Lowland Mounted Brigade Field Ambulance.—Lieutenant Robert B. Carslaw, M.B., to be Captain, dated October 7, 1909.

2nd London (City of London) General Hospital.—Major William H. White, M.D., to be Lieutenant-Colonel, dated November 9, 1909.

Captain Herbert P. Hawkins, M.D., to be Major, dated November 9, 1909.

For attachment to Units other than Medical Units.

Lieutenant Charles Henry Bullen, from the 3rd North Midland Field Ambulance, Royal Army Medical Corps, to be Lieutenant, dated October 1, 1909.

Captain (Honorary Lieutenant in the Army) Edmund William Herrington, from the 3rd London (City of London) Field Ambulance, Royal Army Medical Corps, to be Captain, dated October 18, 1909.

4th Battalion, the Lincolnshire Regiment.—Surgeon-Major and Honorary Surgeon-Lieutenant-Colonel George M. Lowe, M.D., resigns his commission, and is granted permission to retain his rank and to wear the prescribed uniform, dated November 3, 1909.

ROYAL ARMY MEDICAL CORPS.

Attached to Units other than Medical Units.

Lieutenant Alfred A. Beeks to be Captain, dated May 26, 1908.

Lieutenant-Colonel John W. Ellis resigns his commission, and is granted permission to retain his rank and to wear the prescribed uniform, dated November 6, 1909.

Lieutenant John Hobbs, F.R.C.S.(I.), to be Captain, dated November 7, 1909.

For attachment to Units other than Medical Units.

Kenneth Mackinnon, M.B., to be Lieutenant, dated April 1, 1909.

Percy Bertram Spurgin to be Lieutenant, dated November 16, 1909.

ROYAL ARMY MEDICAL CORPS.

1st West Lancashire Field Ambulance.—Arthur John Evans (late Surgeon, Royal Naval Volunteer Reserve) to be Captain, dated December 15, 1909.

For attachment to Units other than Medical Units.

Dudley William Carmalt Jones to be Lieutenant, dated October 26, 1909.

Joseph Hollins Donnell, M.B., to be Lieutenant, dated November 5, 1909.

UNATTACHED LIST FOR THE TERRITORIAL FORCE.

Quartermaster and Honorary Lieutenant George Edmund Barford, from 2nd Home Counties Field Ambulance, Royal Army Medical Corps, to be Quartermaster with the honorary rank of Lieutenant, with precedence as from February 26, 1907, dated December 15, 1909.

QUEEN ALEXANDRA'S IMPERIAL MILITARY NURSING SERVICE.

Postings and Transfers.—Sisters: Miss N. Blew, to Tidworth, from Cambridge Hospital, Aldershot; Miss M. M. Blakely, to Egypt from Khartoum; Miss A. Willes, to Woolwich from T.S. "Plassy"; Miss W. Potter, to Chatham, from Devonport; Miss

G. M. Smith, to Khartoum, from Cairo. Staff Nurses: Miss F. M. Tosh, to Alexandria, from Cairo; Miss C. G. Lees, to Alexandria, from Cairo; Miss M. Davis, to Cairo, from Khartoum; Miss H. V. B. Wolseley, to Netley, from Connaught Hospital, Aldershot; Miss C. M. MacRae, to Shorncliffe, from Netley; Miss E. B. Levay, to Connaught Hospital, Aldershot, from Shorncliffe; Miss C. G. Lees, to Khartoum, from Alexandria; Miss M. Willes, to Cambridge Hospital, Aldershot, from T.S. "Plassy."

Appointments Confirmed.—Staff Nurses: Miss A. H. Esden, Miss A. L. Evans, Miss G. M. Watkins.

THE ARMY MEDICAL OFFICERS' WIDOWS' AND ORPHANS' FUND, INSTITUTED JANUARY, 1816.

THIS Society was instituted in January, 1816.

President.—Surgeon-General Sir A. Keogh, K.C.B., M.D., K.H.P., Director-General.

Vice-Presidents.—Deputy-Surgeon-General C. A. Innes, M.D.; Deputy-Surgeon-General W. G. Don, M.D.

Trustees.—Lieutenant-Colonel J. Martin; Lieutenant-Colonel J. Stevenson, M.D.; Deputy-Surgeon-General C. A. Innes, M.D.

Committee for 1909-10.—Surgeon-General Sir W. D. Wilson, K.C.M.G.; Lieutenant-Colonel W. Grant Macpherson, C.M.G., M.D.; Lieutenant-Colonel A. M. Davies; Lieutenant-Colonel M. W. Russell; Surgeon-General W. S. M. Price; Colonel J. Lane Notter, M.D.; Major E. L. McSheehy, M.D.; Lieutenant-Colonel A. F. S. Clarke, M.D.; Major W. H. Horrocks, M.B.

Auditors.—Messrs. Deloitte, Plender, Griffiths, and Co., Chartered Accountants.

Consulting Actuary.—H. W. Andras, Esq., F.I.A.

Honorary Treasurer.—Sir James R. D. McGrigor, Bart.

Bankers.—Sir C. R. McGrigor, Bart., and Co., 25, Charles Street, St. James's Square (to whom all subscriptions should be paid).

Secretary.—Captain J. T. Clapham, 20, Belgrave Road, Westminster, S.W.

This Society was founded by Sir James McGrigor in the year after Waterloo. At his retirement, shortly before the Crimean War, it numbered no less than 650 members. New rules having been recently adopted, the attention of officers of the Corps who wish to make some provision for their widows and orphans, on the most advantageous terms, is invited to the benefits now offered by the above Fund.

Under these rules, owing to the large accumulated fund, and economical management on mutual principles, an officer can provide an annuity for his widow and orphans at a very moderate annual outlay.

The benefit provided by the Society to the subscriber's widow, under his marriage subsisting at the date of commencement of his subscription as a married member, is £50 per annum during widowhood, with the continuance of the annuity, during re-marriage of the widow or after her death, to the child or children of the said marriage until such child, or the youngest of such children, shall have attained the age of twenty-one years. Furthermore, should the wife of the subscriber predecease him, it will be optional for him to continue until his death the subscription he had been paying as a married member, in order to provide an annuity similar to the above for the children of the marriage, until the youngest shall have attained the age of twenty-one years. Some examples of the new scales of premiums are given below:—

Husband's age,	25	..	Wife's age, 20	Ann. Subs.,	£13	8	5
,, ,,	25	..	,, ,, 25	,, ,,	12	6	5
,, ,,	30	..	,, ,, 25	,, ,,	14	18	6
,, ,,	30	..	,, ,, 30	,, ,,	13	9	10
,, ,,	35	..	,, ,, 30	,, ,,	16	14	5
,, ,,	35	..	,, ,, 35	,, ,,	14	17	6
,, ,,	40	..	,, ,, 35	,, ,,	18	17	7
,, ,,	40	..	,, ,, 40	,, ,,	16	9	10
,, ,,	45	..	,, ,, 40	,, ,,	21	8	6
,, ,,	45	..	,, ,, 45	,, ,,	18	7	7
,, ,,	50	..	,, ,, 45	,, ,,	24	9	5
,, ,,	50	..	,, ,, 50	,, ,,	20	11	1

It must be borne in mind that *the above terms cover all war and climate risks ; and that there are no marriage fines.*

There is a class of unmarried members who pay £2 a year. They are allowed the equivalent (in terms of Table B in the Rules) of the total of their subscriptions, at compound interest, by way of reduction of their annual subscription when becoming married members. Thus an officer joining the Society at the age of 34, his wife being 30, would pay an annual premium of £15 19s. 9d. Had he joined ten years earlier as an unmarried member, his yearly subscription as a married member would have been £14 12s. 9d. for the rest of his life.

At the last quinquennial valuation of the assets and liabilities of the Society, as at December 31, 1905, the Actuary reported that "the financial position of the Society was eminently satisfactory ; there being a net surplus of £64,390 after providing for annuities, immediate and contingent, to all widows of members. At that date the Funds of the Society amounted to £125,400. On December 31, 1908, it will be seen from the balance sheet that they had increased to £131,000; and that of this sum five-sixths are invested in Government, and the remainder in Trust securities.

Provision is made (Rule X.) whereby the surplus at any quinquennial valuation may be applied for the benefit of members.

A copy of the Rules, the Actuary's Report, and other details, can be obtained from the Secretary, Captain J. T. Clapham, 20, Belgrave Road, S.W.

UNITED SERVICES MEDICAL SOCIETY.

THE next meeting of the above-named Society will be held at the Royal Army Medical College, Millbank, S.W., on Wednesday, January 12, 1910, at 8.30 p.m,, when a paper will be read by Lieutenant-Colonel J. B. Wilson, R.A.M.C., on "The Management of Venereal Diseases at Woolwich."

BIRTHS.

ARGLES.—At Sutherland House, Cheniston Gardens, W., on November 4, 1909, the wife of Captain R. L. Argles, of a son.

WALKER.—On December 2, 1909, at 2, Kensington Crescent, the wife of Captain N. Dunbar Walker, R.A.M.C., of a daughter.

WOOD.—On November 19, at Bareilly, N.W.P., India, the wife of Lieutenant J. L. Wood, R.A.M.C., of a son.

MARRIAGE.

JOHNSON—PRESTON.—On October 30, 1909, at Essex Church, The Mall, Kensington, by the Rev. Frank K. Freeston and the Rev. W. Copeland Bowie, Captain Valentine Goode Johnson, R.A.M.C., Peshawar, India, to Dorothy Jacqueline, youngest daughter of Percy Preston, of 9, Randolph Road, Maida Hill, W., and Cotswold, Wickford, Essex.

DEATHS.

JAMESON.—At Farnborough, Mary Cochrane, the infant daughter of Captain and Mrs. A. D. Jameson, R.A.M.C., aged 6 months.

SCOTT.—At 30, Burlington Road, Donnybrook, Dublin, on November 7, 1909, Honorary Deputy-Surgeon-General James Edward Scott, M.B., half-pay, late Army Medical Department, aged 85. He entered the Service on June 11, 1847, became Surgeon February 9, 1855, Surgeon-Major June 11, 1867, and retired with the honorary rank of Deputy-Surgeon-General on December 6, 1873. He served with the Rifle Brigade in the Kaffir War of 1852-3, including the expedition beyond the Kei in August, 1852, and the final clearing of the Waterkloof. Embarked with the Rifle Brigade and served throughout the Eastern Campaign of 1854-5 from March, 1855, as Surgeon of the 41st Regiment. Medal and four clasps; 5th class of the Medjidie and Turkish medal.

McQUAID.—At 6, Vyne Road, Basingstoke, on December 10, 1909, Colonel Peter John McQuaid, M.D., retired pay, late Royal Army Medical Corps. He entered the Service on September 30, 1873; was promoted Surgeon-Major, September 30, 1885; Surgeon-Lieutenant-Colonel, September 30, 1893, and retired on August 19, 1896. He was promoted to a Colonelcy on the retired list on October 18, 1902, in recognition of his services during the operations in South Africa. His War Services were: Afghan War, 1878-9. At the battle of Charasiab; actions of Karez Mia and Aowshar, and subsequent defence of Sherpur Cantonments. Medal with 2 clasps. Egyptian Expedition, 1882; Action at Kassassin of September 9; Battle of Tel-el-Kebir. Medal with clasp, bronze star.

BOURKE.—At Vancouver, British Columbia, on November 2, 1909, Surgeon-Major Isidore Bourke, M.B., late Army Medical Department, aged 67. He entered the service on September 30, 1864, became Surgeon-Major September 30, 1876, and retired on March 17, 1882.

McLAUGHLIN.—On November 23, 1909, Lieutenant-Colonel Henry James McLaughlin, M.B., retired pay, late Royal Army Medical Corps, aged 54. He entered the Army Medical Department on February 3, 1878, and became Surgeon-Major, Medical Staff, on February 3, 1890; Lieutenant-Colonel, Royal Army Medical Corps on July 27, 1901, and retired on November 6, 1901.

WARD.—On November 28, 1909, Surgeon-Major Espine Charles Robert Ward, retired pay, late Army Medical Department. He entered the Service as Assistant-Surgeon on April 1, 1871, served in the staff and in the 65th Foot, became Surgeon, Army Medical Department on March 1, 1873, Surgeon-Major, April 1, 1883, and retired on October 28, 1887. His War Services were as follows: South African War, 1879-81; Zulu Campaign, and at the attack and capture of Sekukunis' stronghold. Medal with clasp. Transvaal Campaign, 1880-1; Action at Modder Spruit (slightly wounded); Despatches *London Gazette*, March 29 and June 10, 1881.

EXCHANGES, &c.

The charge for inserting Notices respecting Exchanges in the Royal Army Medical Corps is 5/- for not more than five lines, which should be forwarded by Cheque or P.O.O., with the notice, to Messrs. G. STREET and CO., Ltd., 8, Serle Street, London, W.C., not later than the 22nd of the month.

Field Officer, just returned from abroad, is willing to exchange to India. Apply to Eastern Exchange, c/o Messrs. Holt & Co.

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		£ s. d.	£ s. d.	s. d.	s. d.	s. d.	s. d.
12	4	0 2 6	0 1 0	3 6	0 11	3 2	0 7
	8	0 4 6	0 2 0				
	16	0 7 6	0 3 6				
25	4	0 3 0	0 1 3	4 0	1 3	3 6	0 9
	8	0 5 6	0 2 6				
	16	0 9 6	0 4 6				
50	4	0 4 0	0 1 8	5 0	1 9	4 0	1 0
	8	0 6 9	0 3 2				
	16	0 12 0	0 5 3				
100	4	0 5 6	0 2 9	6 6	3 3	5 6	2 0
	8	0 9 0	0 4 4				
	16	0 16 9	0 6 9				
200	4	0 8 6	0 4 0	9 0	6 3	7 6	4 0
	8	0 13 6	0 6 0				
	16	1 3 6	0 8 9				

* These are not arranged as Reprints, but appear precisely as in the Journal with any other matter that in the Journal may happen to appear on the first and last pages of the particular excerpt ordered.

Cases for Binding Volumes.—Strong and useful cases for binding can be obtained from the publishers at the undermentioned rates:—

Covers, 1s. 4d. net; binding, 1s. 2d.
These charges are exclusive of cost of postage.

In forwarding parts for binding the name and address of sender should be enclosed in parcel.

Notices.

EDITORIAL NOTICES.

The Editor will be glad to receive original communications upon professional subjects, travel, and personal experiences, &c. He will also be glad to receive items of news and information regarding matters of interest to the Corps from the various garrisons, districts, and commands at home and abroad.

All such Communications or Articles accepted and published in the "Journal of the Royal Army Medical Corps" will (unless the Author notified at the time of submission that he reserves the copyright of the Article to himself) become the property of the Library and Journal Committee, who will exercise full copyright powers concerning such Articles.

Matter intended for the Corps News should reach the Editor not later than the 15th of each month for the following month's issue. Notices of Births, Marriages, and Deaths are inserted free of charge to subscribers and members of the Corps. All these communications should be written upon one side of the paper only; they should by preference be type-written, but, if not, all proper names should be written in capital letters (or printed) to avoid mistakes, and be addressed The Editor, "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS," War Office, Whitehall, London, S.W.

Communications have been received from Major C. H. Hale, Major C. E. Pollock, Captain D. Harvey, Major F. W. Begbie, Captain D. S. Skelton, Captain L. Bousfield, Captain C. H. Gibbon, Brevet-Colonel R. H. Firth, Captain J. C. Kennedy, Captain J. H. Balck, Captain D. B. Thomson, Dr. Andrew Balfour, Major G. H. Moore, Colonel A. E. W. Count Gleichen, Captain A. B. Cummins, Captain H. C. Sidgwick, Major W. S. Harrison, Lieutenant-Colonel D. M. O'Callaghan, Major Leonard Rogers, I.M.S., Captain R. G. Archibald.

The following publications have been received:—

British: The Medical Press and Circular, The Royal Engineers' Journal, Proceedings of the Royal Society of Medicine, Journal of the Royal Sanitary Institute, Proceedings of the Royal Society, The Practitioner, Red Cross and Ambulance News, On the March, Army and Navy Gazette, The Lancet, Public Health, The Medical Review, St. Thomas's Hospital Gazette, St. Bartholomew's Hospital Journal, The Shield, The Journal of Tropical Medicine and Hygiene, Indian Medical Gazette, The All-India Hospital Assistants' Journal, Transactions of the Society of Tropical Medicine and Hygiene, The Middlesex Hospital Journal.

Foreign: Archives de Médecine Navale, Japanese Medical Journal, The Military Surgeon, Le Caducée, Archives de Médecine et de Pharmacie Militaires, Archiv für Schiffs-und Tropen-Hygiene, Revista de Sanidad Militar y La Medicina Militar Española, American Medicine, Bulletin of The Johns Hopkins Hospital, Annali di Medicina Navale e Coloniale, Archives de l'Institut Pasteur de Tunis, Bulletin de l'Institut Pasteur, Militärgeographie.

MANAGER'S NOTICES.

The JOURNAL OF THE ROYAL ARMY MEDICAL CORPS is published monthly, six months constituting one volume, a volume commencing on 1st July and 1st January of each year.

The Annual Subscription is £1 (which includes postage), and should commence either on 1st July or 1st January; but if a subscriber wishes to commence at any other month he may do so by paying for the odd months between 1st July and 1st January at the rate of 1s. 8d. (one shilling and eightpence) per copy. (All subscriptions are payable in advance.)

Single copies can be obtained at the rate of 2s. per copy.

The Corps News is also issued separately from the Journal, and can be subscribed for at the rate of 2s. (two shillings) per annum, including postage. Subscriptions should commence from 1st July each year; but if intending subscribers wish to commence from any other month, they may do so by paying for the odd months at the rate of 2d. per copy. (All subscriptions are payable in advance.)

Officers of the Royal Army Medical Corps possessing Diplomas in Public Health, &c., are kindly requested to register their special qualifications at Headquarters. Letters of complaint are frequently received from officers stating that their special qualifications have not been shown in the Distribution List which is published as a supplement to the Journal in January and July of each year. As, however, the particulars of this list are supplied from official sources, officers are reminded that unless the possession of Diplomas, &c., has been registered at Headquarters, no entry of such qualifications can be recorded in the Distribution List.

Letters regarding non-delivery of the Journal, or change of address, should be sent to the Hon. Manager, "Journal of the Royal Army Medical Corps," War Office, Whitehall, London, S.W., and reach there not later than the 20th of each month.

It is requested that all Cheques or Postal Orders for Subscriptions to the Journal, Corps News, Reprints, &c., be crossed "Holt & Co.," and made payable to the "Hon. Manager, Journal R.A.M.C.," and not to any individual personally.

All communications for the Hon. Manager regarding subscriptions, &c., should be addressed to

THE HON. MANAGER,
"JOURNAL OF THE ROYAL ARMY MEDICAL CORPS,"
WAR OFFICE, WHITEHALL, S.W.

JOURNAL

OF THE

ROYAL ARMY MEDICAL CORPS.

Corps News.

February, 1910.

ARMY MEDICAL SERVICE.

Colonel John M. Jones is placed on retired pay, dated January 2, 1910.

He entered the service on March 6, 1880; became Surgeon-Major on March 6, 1892; Lieutenant-Colonel on March 6, 1900; was selected for the higher rate of pay of that rank on January 14, 1903; promoted Colonel on September 18, 1907.

His war service is as follows: South African War, 1879—Zulu Campaign, as Civil Surgeon. Medal with clasp.

Lieutenant-Colonel Thomas J. R. Lucas, C.B., M.B., from the Royal Army Medical Corps, to be Colonel, *vice* J. M. Jones, dated January 2, 1910.

Colonel George T. Goggin is placed on retired pay, dated January 14, 1910.

He entered the service on March 6, 1880; became Surgeon-Major on March 6, 1892; Lieutenant-Colonel on March 6, 1900; promoted Colonel on September 6, 1907.

His war service is as follows: South African War, 1899-1902, Senior Medical Officer and Principal Medical Officer, Infantry Division. Relief of Ladysmith, including action at Colenso. Operations of January 17 to 20, 1900, and action at Spion Kop; operations of February 5 to 7, 1900, and action at Vaal Kranz; operations at Tugela Heights, February 14 to 27, 1900, and action at Pieter's Hill; operations in Transvaal, June, 1900; operations in Natal, March to June, 1900, including action at Laing's Nek, June 6 to 9; operations in Transvaal, East of Pretoria, July to November, 1900. In charge of a General Hospital, Orange River Colony, November, 1900, to May, 1902. Despatches (Sir R. H. Buller, March 30 and November 9, 1900), *London Gazette*, February 8, 1901, and July 29, 1902. Queen's Medal with six clasps. King's Medal with two clasps.

Lieutenant-Colonel Robert Porter, M.B., from the Royal Army Medical Corps, to be Colonel, *vice* G. T. Goggin, dated January 14, 1910.

ROYAL ARMY MEDICAL CORPS.

Captain Dudley S. Skelton, from the Seconded List, is restored to the Establishment, dated December 11, 1909.

Quartermasters and Honorary Lieutenants Alexander Morrison and Frederick W. Hall are granted the Honorary Rank of Captain, dated January 3, 1910.

Quartermaster and Honorary Captain A. Morrison retires on retired pay, dated January 5, 1910.

ESTABLISHMENTS.—Royal Hospital, Chelsea, Lieutenant-Colonel Reginald J. C. Cottell, Royal Army Medical Corps, from Deputy-Surgeon, to be Physician and Surgeon, *vice* Colonel C. Seymour, M.B., whose period of appointment has expired, dated January 1, 1910.

Major Frederick Kiddle, M.B., Royal Army Medical Corps, to be Deputy-Surgeon, *vice* Lieutenant-Colonel R. J. C. Cottell, dated January 1, 1910.

TRANSFERRED TO HOME ESTABLISHMENT.—Major C. Dalton; Captains J. H. Brunskill, H. H. A. Emerson.

ARRIVALS HOME FOR DUTY.—From Hong Kong: Lieutenant-Colonels J. M. Reid; Captain P. H. Collingwood. From Malta: Lieutenant-Colonel C. Birt. From India: Lieutenant-Colonel A. R. Aldridge, Major H. W. K. Read, Captains J. D. Richmond, R. B. Hole, H. Harding, M. F. Grant. From Egypt: Major W. D. Eskine. From South Africa: Major J. E. Carter, Captains F. C. Lambert, S. E. Lewis. From Jamaica: Captain P. Farrant. From Straits Settlements: Captain C. J. Wyatt.

Quartermaster and Honorary Major C. Crawley arrived from Egypt on December 21, 1909, and has been posted to the Eastern Command for duty.

POSTINGS.—London District: Lieutenant-Colonels J. M. Reid and C. Birt. Aldershot: Lieutenant-Colonels A. R. Aldridge and J. H. Brunskill. Irish Command: Major C. Dalton, Captains J. D. Richmond and R. B. Hole. Northern Command: Majors W. D. Erskine and H. W. K. Read. Eastern Command: Major J. E. Carter, Captains S. E. Lewis and H. H. A. Emerson. Southern Command: Captains P. H. Collingwood, F. C. Lambert, H. Harding, M. F. Grant, and P. Farrant. Scottish Command: Captain C. J. Wyatt.

APPOINTMENTS.—Lieutenant-Colonel J. M. Reid, Senior Medical Officer, London Recruiting District; Lieutenant-Colonel M. T. Yarr, Medical Inspector of Recruits, Scottish Command; Lieutenant-Colonel A. R. Aldridge, Instructor, School of Army Sanitation; Lieutenant-Colonel R. D. Hodson, R.P., Medical Charge at Trowbridge.

TRANSFERS.—Lieutenant-Colonel R. J. S. Simpson, from the London District to the Eastern Command. Major B. H. Scott, from the Scottish to the London District for duty at the War Office.

EMBARKATIONS.—For South Africa: Lieutenant-Colonels R. J. D. Hackett and S. E. Duncan, Major J. F. M. Kelly, and Captain H. M. Morton. For India: Majors W. C. Poole, H. W. Grattan, Captains C. J. O'Gorman, D.S.O., F. J. Palmer, and L. M. Purser. For Bermuda Captains E. McDonnell and W. L. Bennett. For Gibraltar: Lieutenant H. S. Dickson.

Quartermasters and Honorary Lieutenants E. Houghton and A. Clapshaw embarked for South Africa on January 1, 1910.

INCREASED PAY.—Lieutenant-Colonel T. B. Winter has been selected for increased pay from December 14, 1909.

QUALIFICATIONS.—Captain J. A. Anderson, M.B., has obtained the Diploma in Tropical Medicine and Hygiene of the University of Edinburgh.

Captain S. B. Smith, M.D., has obtained the Diploma in State Medicine of the University of Dublin, 1909.

RESULTS OF EXAMINATION OF LIEUTENANTS, ROYAL ARMY MEDICAL CORPS.

The following results of examinations are notified for general information:—

Passed in (*b*) for rank of Captain: L. A. A. Andrews; F. J. Stewart, M.B., M. Leckie, C. M. Rigby, W. J. Dunn, M.B.

Passed in (*h*) i for rank of Captain: A. H. Jacob.

Royal Army Medical Corps.

Promotions.

To be Serjeant-Major.—9984 Quartermaster-Serjeant F. C. Cross, December 13, 1909, *vice* C. A. Barton to pension.

To be Staff-Serjeant.—9903 Serjeant R. T. Pack, December 10, 1909, *vice* T. N. Cardwell to Territorial Force.

Appointments.

To be Lance-Corporal.—Special under para. 281, S.O., R.A.M.C.: 45 Private T. G. Moffatt, December 20, 1909; 19641 Private H. M. Hardie, December 20, 1909; 19070 Private H. Siddall, December 24, 1909.

To be Buglers.—1401 Boy E. H. Baxter, December 1, 1909; 4405 Boy E. F. Taylor, December 3, 1909.

Deaths.

1388 Private J. Lewis, December 10, 1909, Aldershot.

Embarkations for Abroad.

For South Africa, per ss. "Braemar Castle," December 31, 1909: 7345 Serjeant-Major W. Deans, 10259 Quartermaster-Serjeant F. Higdon, 15096 Serjeant J. E. Pugh, 17699 Private C. Morrall, 1972 Private B. Davidson.

For Gibraltar, per ss. "Braemar Castle," December 31, 1909: 17280 Corporal A. Lindford, 17663 Corporal G. Duerdon, 17557 Lance-Corporal J. F. Starie, 431 Private E. Holden, 599 Private F. G. Knight, 756 Private G. Pateman, 911 Private W. Clough.

For Bermuda, per ss. "Braemar Castle," December 31, 1909: 10932 Staff-Serjeant C. Ward, 12441 Serjeant L. Hubbard, 11594 Corporal C. Ryan, 586 Lance-Corporal W. A. Gordon, 18490 Private H. Cooper, 17179 Private T. McEmery, 16132 Private J. E. Miller, 15911 Private C. Phillips, 249 Private A. H. Scovell, 1070 Private G. H. Harwood.

For Malta, per H.T. "Rewa," January 5, 1910: 10435 Quartermaster-Serjeant A. Humingford, 18110 Corporal R. W. Gibson, 16261 Private G. R. Wheeler, 935 Private H. M. Griffiths Williams, 738 Private M. Ryan, 11443 Private H. Cliburn, 1094 Private H. B. Alloway, 991 Private E. A. Betts, 1031 Private H. Moon, 1131 Private F. O. Burge, 1247 Private F. E. Buckland, 16299 Private E. P. Plunkett, 4352 Private C. Henry, 1865 Private R. Johnstone.

Disembarkations from Abroad.

From Singapore, per H.T. "Rewa," December 21, 1909: 18977 Corporal C. M. Pickup, 18977 Private G. Alberts, 19900 Private B. Benham, 9561 Private J. Gadbury, 17790 Private G. H. Barber.

From Ceylon, per H.T. "Rewa," December 21, 1909: 9709 Quartermaster-Serjeant H. Muggleton, 12146 Serjeant W. J. Wilson, 14503 Serjeant G. Fottinger, 12223 Corporal A. L. Drake, 14693 Corporal F. W. Kay, 19609 Private F. J. Aldridge, 19255 Private H. L. Foster, 17223 Private H. White.

From Ceylon, per ss. "Orontes," December 2, 1909: 17005 Corporal J. H. Turner.

From Egypt, per ss. "Princess Alice," December 25, 1909: 9984 Quartermaster-Serjeant F. C. Cross.

From Tientsin, per H.T. "Rewa," December 21, 1909: 10813 Quartermaster-Serjeant A. G. Andus, 14735 Corporal J. A. Cox, 12618 Lance-Corporal W. A. Mayman, 19171 Private W. A. Smith, 19680 Private W. Davis.

From Hong Kong, per H.T. "Rewa," December 21, 1909: 6891 Serjeant-Major A. Fowler, 12651 Corporal R. H. Bennett, 17128 Lance-Corporal F. G. Fuller, 17012 Lance-Corporal E. Byrne, 29 Private G. Hart, 17259 Private T. Waters, 18766 Private W. Wardale.

From Mauritius, per ss. "Braemar Castle," December 20, 1909: 11074 Lance-Serjeant A. J. Daintree, 4390 Private T. Barlow, 4521 Private A. Clark, 19384 Private J. C. Cowen, 2179 Private W. Green, 18807 Private J. Kendall, 19469 Private H. P. Purnell, 18799 Private V. Smith.

From South Africa, per ss. "Braemar Castle," December 20, 1909: 10604 Staff-Serjeant C. Elliott, 11059 Staff-Serjeant J. Dunn, 12174 Corporal S. Billott, 18420 Corporal H. T. Sanderson, 16933 Private T. Wareing, 17088 Private W. E. Palmar, 19444 Private H. A. Jones, 17792 Private C. Chittenden, 17761 Private H. A. Dunkley, 17698 Private A. Betterden, 17362 Private H. B. Shaw, 14297 Private W. H. Bunce, 17127 Private J. Fetlow.

From Egypt, per H.T. "Rewa," December 21, 1909: 18128 Private J. T. Marr, 19379 Private W. Young, 391 Private W. J. Scorey.

From Jamaica, per ss. "Tagus," December 27, 1909: 10820 Serjeant J. Pearson, 17644 Serjeant R. E. Hart, 17512 Private C. Fish, 18021 Private J. Carleton, 18105 Private G. T. Hare, 19564 Private A. J. Wilson.

The following N.C.O.'s and Men have qualified for Promotion in the various Corps Examinations.

For Quartermaster-Serjeant.—8947 Staff-Serjeant W. Hicks, 8269 Staff-Serjeant G. A. Gibbs, 9245 Staff-Serjeant H. Cassell.

For Staff-Serjeant.—8886 Serjeant E. E. Sparrow, 10327 Serjeant J. C. Carder, 10751 Serjeant G. C. Reeves.

For Corporal.—12594 Private W. Wright, 19261 Private A. T. Croft, 19946 Private H. J. Hillier, 19930 Private A. Pickard.

Discharges.—6365 Serjeant-Major H. B. Wall, January 13, 1910, to pension; 9435 Quartermaster-Serjeant J. McEvoy, January 18, 1910, medically unfit; 6129 Staff-Serjeant E. W. Simpson, December 21, 1909, termination of engagement; 11555 Staff-Serjeant H. Bullock, December 4, 1909, to pension; 9043 Serjeant J. Murley, October 4, 1909, to pension; 8250 Corporal G. Sandfield, December 31, 1909, termination of second period; 11649 Corporal J. H. Mustill, December 27, 1909, termination of first period; 12174 Corporal S. Billott, January 18, 1910, medically unfit; 4376

Private G. Lister, December 22, 1909, free under R.W.; 17127 Private J. Tetlow, January 18, 1910, medically unfit.

TRANSFERS TO ARMY RESERVE.—18729 Private E. A. H. A. Blacklin, December 13, 1909; 1059 Private C. S. Ball, December 12, 1909; 16847 Corporal E. R. Benn, December 12, 1909; 16857 Private F. Smith, December 18, 1909; 16856 Private J. Loram, December 18, 1909; 16880 Private W. T. Fairley, December 22, 1909; 16881 Private T. Glancy, December 22, 1909; 16887 Private G. E. Crosby, December 26, 1909; 16914 Private S. Holmes, December 29, 1909; 16950 Private G. H. Telford, December 30, 1909; 1093 Private J. Wright, December 31, 1909; 16889 Private S. Pain, December 30, 1909; 16948 Private J. Heath, December 30, 1909; 16933 Private T. Waring, January 2, 1910; 17005 Corporal J. H. Turner, January 5, 1910; 16931 Private W. Langtree, January 2, 1910; 1067 Private R. L. Laversuch, January 3, 1910; 16983 Private W. Hoggett, January 3, 1910; 16925 Private W. Cochrane, January 1, 1910; 14742 Private W. Burns, January 14, 1910; 16997 Corporal W. H. Youtton, January 10, 1910; 16943 Private W. Wright, January 6, 1910; 1069 Private H. Jarrett, January 2, 1910; 16989 Private H. Campbell, January 7, 1910; 17473 Private G. A. Allsop, January 3, 1910; 17006 Private R. Mair, January 6, 1910; 16955 Private C. White, January 2, 1910; 16991 Private H. Ward, January 7, 1910; 17002 Private S. Boyd, January 5, 1910; 17012 Corporal E. Byrne, January 8, 1910; 17043 Private W. A. Walker, January 12, 1910; 17035 Private J. Craig, January 9, 1910; 17036 Private W. Arkwright, January 12, 1910; 1075 Private J. Whitaker, January 10, 1910; 17088 Private W. E. January 15, 1910.

TRANSFERS TO OTHER CORPS.—10142 Staff-Serjeant T. W. Cardwell, December 10, 1909, to Territorial School of Instruction, London; 11583 Serjeant W. McCarthy, December 20, 1909, to 2nd Lowland Field Ambulance, Territorial Forces; 4533 Private J. Bone, December 13, 1909, to Gordon Highlanders; 2099 Private S. Wylie, January 7, 1910, to Royal Field Artillery; 4632 Private T. H. Williamson, January 10, 1910, to Royal Horse Artillery.

TRANSFERS FROM OTHER CORPS.—4743 Private T. Jeeves, December 1, 1909, from Royal Dublin Fusiliers; 4781 Private M. J. Gilbert, October 10, 1909, from D. C. Light Infantry.

NOTES FROM FORT PITT, CHATHAM.—Serjeant-Major H. J. Ford writes: "Christmas Day was suitably celebrated at Fort Pitt, Chatham. The patients' dining hall was beautifully decorated and the tables were tastefully laid out by the Matron, Nursing Sisters, and staff nurses, who also waited on the sick. The men who were unable to attend the dining hall were not forgotten, for they had their Christmas dinner in the wards. Great credit is due to everyone concerned for the excellent manner in which the sick were catered for.

"After the patients' dinner the men of No. 10 Company, Infantry and Special Reservists, sat down to their own Christmas fare in No. 18 Barrack-room, and here again great credit is due to everyone concerned for the excellent manner in which they decorated the room and catered for the men. The men were visited by Lieutenant-Colonel Cree, Major Master, Captain Pallant and Lieutenant Bevis, and also by the matron and nursing staff. After the health of the men had been drunk, a few appropriate remarks were made by Lieutenant-Colonel Cree, who also referred to his early departure to India; although he has only been here a short time, his departure from this station will be greatly felt by all ranks.

"The N.C.O.'s (after waiting on the company) sat down to their own Christmas dinner at 3 p.m. in their mess-room. This room was prettily and tastefully decorated by Serjeants Wheeler and Wilkinson.

"In the evening an excellent concert was given to the patients in No. 5 Ward, and was greatly appreciated by everyone present. A hearty vote of thanks was put forward and carried unanimously for the ladies and gentlemen who sung, &c.

"This was followed by an excellent tea given by the sisters and staff nurses for the patients in hospital. This was also greatly appreciated. The Christmas festivities were brought to a close on New Year's Eve by an excellent tea for the sick in hospital in No. 7 Ward, a tea for the married families, No. 10 Company, Royal Army Medical Corps, and Christmas tree in the patients' dining hall. Our best thanks are due to Mrs. Master (wife of Major Master, R.A.M.C.) for the excellent way in which she decorated the tree.

"After the presentation of toys, &c., to the children, and suitable presents to the married women, everyone adjourned to No. 2 Ward (which was very prettily decorated) for a cinematograph and gramophone entertainment; this was thoroughly enjoyed by everybody present."

NOTES FROM THE SOUTHERN COMMAND.—Corporal D. Macdonald writes:—

"CHRISTMAS ENTERTAINMENT AT ALEXANDRA HOSPITAL, COSHAM.

"On Christmas Day the headquarters of the Company were provided with a substantial dinner followed by a smoking concert in the evening, to which the following artistes contributed; Pianoforte selections, Mr. Brown; songs by Corporal Keohane, Privates Scott, Poole, Daniels, Johnston, Ward, Crofts, Messrs. Ansell, Tree, Bailey, Bushell, and Fullick. A descriptive song and fantasia entitled 'The Pride of the Navy' was splendidly rendered by Messrs. Brown and Co. Private Cavers, a clever illusionist, gave an exhibition of his art. A song and sword dance was given by Corporal Macdonald, and a musical *mélange* by Messrs. Bushell, Cheel, and Brown (mandolinists), and Master W. Brown (violinist).

"On Thursday, January 6, a Christmas tea and tree were provided by the officers and ladies of the Royal Army Medical Corps, Portsmouth, for the married families of the Company. The tea was served at 4 p.m. in the dining hall, which had been decorated for the occasion.

"The tea was followed by a Christmas tree, which, brightly illuminated with numerous candles, seemed loaded with pretty and suitable presents which were handed to each child by Mrs. Morse. This was followed by a musical evening, during which the following items were contributed with great success: Songs by Corporals White and Tannar, Privates Poole, Daniels, Scott and Hall; pianoforte and violin selections by Mr. and Master W. Brown; recitation by Corporal Cook; a sword dance by Corporal Macdonald; gramophone selections by Mr. Adye; 'God save the King.'

"The clowns (Privates Eley and Scott) kept the audience in roars of laughter during the evening. Our best thanks are due to Lieutenant-Colonel and Mrs. Morse, also to Lieutenant and Quartermaster Mr. Attwood, for their untiring efforts to give a most enjoyable evening, not only to the juveniles, but also to the adults present.

"Amongst those present were Lieutenant-Colonel and Mrs. Morse, Lieutenant-Colonel and Mrs. Adams, Major and Mrs. Watson, Major and Mrs. Way, Major and Mrs. Hayes, Major Marder, Major and Quartermaster Mr. Hurst, Captain Weston, Captain Fawcett, Lieutenant Somers-Gardner, Lieutenant and Quartermaster Mr. Attwood, Matron Wilson and the Nursing Sisters.

"FOOTBALL TEAM.

"Our football team has had up to the present a very good record, they have played sixteen matches this season, won 10, drawn 3, lost 3; goals for 55, against 30.

"In the first round of the 'Harwood Cup' we were lucky in getting a bye. In the second round Chatham suffered a defeat by 4 goals to 1 after a drawn game on the previous day. Journeying to Netley they met No. 4 Company and won a well-merited victory by 5 goals to 3. This placed us for the second year in succession in the final.

"Any of the old Company hands who read this will be glad to see that amongst the players are two old veterans, Corporal Connor, a worthy custodian, and Corporal Hayter, back, the other players being Corporal Cowling, Privates O. B. Turner, Ward, Hahner (Captain), Daniels, Johnston, Dale, Curtiss, Rouse. The team has at present lost the services of their old centre forward, Corporal Smith, who unfortunately had his jaw fractured in the first day's match with Chatham."

NOTES FROM THE NORTHERN COMMAND.—Lieutenant-Colonel Newland writes: "Many changes have recently taken place in the Northern Command, one of which is the loss of our Principal Medical Officer, Surgeon-General W. Donovan, C.B., on retirement from the service in November, 1909. He has left to the regret of the whole corps serving in the Command, Officers, N.C.O.'s, and men, and carries into retirement the respect and esteem of all who were connected with him.

"His successor, Surgeon-General W. W. Kenny, is now on his way home from South Africa, and is expected to join about the end of the present month.

"Lieutenant-Colonel R. H. Penton, D.S.O., Medical Inspector of Recruits, Northern Command, who embarked for India on December 11, 1909, has been succeeded by Lieutenant-Colonel J. J. Gerrard, from Malta.

"Lieutenant-Colonel G. F. H. Marks has also embarked for India, and has been relieved as Officer in Charge, Military Hospital, Newcastle, by Lieutenant-Colonel H. M. Adamson.

"The usual Christmas festivities were held in the Military Hospital, York, the patients being given a special tea on Christmas Eve, followed by a concert, No. 3 Ward being converted temporarily into a concert-room.

"An excellent programme was rendered, and much praise was given to the Matron

and Sisters, Q.A.I.M.N.S., and to Serjeant-Major F. W. Nelson, for the manner in which the concert was conducted. All the items were much appreciated, and loudly applauded by those present.

"PROGRAMME.

"PART I.

March	'Happy Days in Dixie'	BAND 5TH R.I. LANCERS.
Song	'Somewhere'	Miss TALBOT.
Song	'Across the Desert' ..	Corpl. CURTISS, 5th Lancers.
Song	'Invitation'	Major C. H. HALE, D.S.O., R.A.M.C.
Song	'Come, Sweet Morning'	Miss FURNIVAL.
Comic Song	'The Boarding House'	Serjt. LISTER, R.A.M.C.
Song	'Loch Lomond'	Pte. ORTON, R.A.M.C.
Song	'Only Thee'	Mrs. NORRIS.
Song	'I want to go to Idaho'	Pte. ROBINSON, R.A.M.C., S.R.
Selection	Harry Lauder's Songs..	BAND, 5th R.I. LANCERS.

PART II.

Waltz	'L' Etoile' ..	BAND, 5th R.I. LANCERS.
Song	'The Storm Fiend'	Corpl. CURTISS, 5th Lancers.
Comic Song	'The Whistling Nig' ..	Serjt. LISTER, R.A.M.C.
Songs	(1) 'My Treasure' (2) 'Slumber Boat'	Miss FURNIVAL.
Song	'Simon the Cellarer'	Mr. CODYRE, A.P.C.
Song	'Mary of Argyle' ..	Pte. ORTON, R.A.M.C.
Song	'Down the Vale'	Mrs. NORRIS.
Duologue	'Two on a Bus' ..	Mr. and Mrs. FURNIVAL.
Comic Song	'The Same Old Park' ..	Pte. ROBINSON, R.A.M.C.
Song	'There's Nobody just like you'	Major C. H. HALE, D.S.O., R.A.M.C.
Selection	'The Songs of London' ..	BAND, 5th R.I. LANCERS.

"The accompaniments were kindly played by Sisters Humphreys, Q.A.I.M.N.S., Mr. Codyre, A.P.C., and Private Greenwood, Band, 5th R.I. Lancers.

"'GOD SAVE THE KING.'

"On Christmas Day the N.C.O.'s and men of the Royal Army Medical Corps at York sat down to an excellent dinner at 1 p.m. Serjeant-Major Nelson called the Company to their feet, asked them to charge their glasses, and drink to the health of the Officers of the Corps.

"In responding on behalf of the Officers, the Commanding Officer, Lieutenant-Colonel W. Turner, thanked all present for the hearty manner in which they had pledged the health of the officers, and concluded by wishing all present the Compliments of the Season.

"On Wednesday, December 29, 1909, the Royal Army Medical Corps annual smoking concert was held in Dewsbury Block, Infantry Barracks, York, at 8 p.m., Serjeant-Major F. W. Nelson taking the chair.

"There was a very large attendance of the Corps and their friends, numbering about 200. The room had been very tastefully decorated, for which the Committee, Serjeant Cantrell, Corporal Sherman, Privates Brown, Murphy and Walden, deserved and received much thanks.

"The proceedings commenced by the Chairman asking all present to rise and drink the toast of His Most Gracious Majesty, the King. Then followed the musical items:—

"PROGRAMME.

"PART I.

Selection	'The Dollar Princess' ..	BAND, 5th R.I. LANCERS.
Song	'In the Dark'	Pte. ROBINSON, R.A.M.C., S.R.
Encore	'I want to go to Idaho'	
Song and Dance	'The Oyster Man' ..	Pte. PATERSON, R.A.M.C.
Song	'Nobody just like you' ..	Pte. MOORE, R.A.M.C.
Song (Comic)	'Postponed, rather' ..	Pte. FINLAY, R.A.M.C., S.R.
Humorous Sketch..	'On Strike'	Mr. FRANCIS.
Song	'Farewell, Sweetheart' ..	Pte. LANE, R.A.M.C., S.R.
Whistling Solo	'Stars and Stripes'	Pte. GREENWOOD, 5th Lancers.
Clarionet Solo	Selected ..	Corpl. GRINDLEY, 5th Lancers.
Clog Dance.. ..	'Has anybody here seen Kelly?'	Pte. KELLY, R.A.M.C., R.S.
Selection	'Scottish Airs' ..	BAND, 5th R.I. LANCERS.

"PART II.

Selection	'Songs of London' ..	BAND, 5TH R.I. LANCERS.
Song	'The Whistling Nig' ..	Serjt. LISTER, R.A.M.C.
Encore	'I've brought the coal'	
Song (*Comic*)	'The Old Dun Cow'	Mr. POWELL.
Song	'Love me, and the world is mine'	Serjt. SPACKMAN, R.A.M.C.
Encore	'Beware'	
Song	'Down the Vale' ..	Pte. ORTON, R.A.M.C.
Encore	'The Football Match'	
Song	'Vanity Fair'	Pte. ROBINSON, R.A.M.C., S.R.
Encore	'Mandey'	
Song (*Descriptive*)	'Gallery and Boxes'	Mr. FRANCIS.
Encore	'Soliloquy on a Old Shoe'	
Song	'Flight of Ages'	Lce.-Corpl. LUCAS, R.A.M.C.
Song	'If I had a girl as nice as you'	Serjt. MARSH, 5th Lancers.
Song (*Comic*)	'Hey Donal' ..	Corpl. HYDE, 5th Lancers.
Encore	'Killaloo'	
Song	'The Miner's Dream of Home'	Corpl. MIDDLEDITCH, A.S.C.

"During the evening the Company were honoured by the presence of Lieutenant-Colonels J. J. Gerrard and F. R. Newland, and Captain F. W. Lambelle, R.A.M.C. At 9.30 p.m. Serjeant-Major Nelson asked all to rise and drink to the health of the Officers, Royal Army Medical Corps.

"Lieutenant-Colonel Gerrard responded, and apologized for the absence of the Commanding Officer, who was unavoidably absent on account of a previous engagement. He hoped, in conclusion, he would have many such nights with No. 8 Company.

"Serjeant-Major Nelson thanked all present for the support they had afforded him to make that night a success. After 'chairing' him round the room to the singing of 'He's a jolly good fellow,' 'Auld Lang Syne' was sung and a very enjoyable evening was brought to a close by the singing of 'God Save the King.'"

NOTES FROM THE SCOTTISH COMMAND. — Major J. P. Silver writes: "Christmas has been celebrated right royally by the headquarters of No. 13 Company in Edinburgh. The festivities began on Christmas Eve with a tea and concert, got up for the married families of the Corps and the patients in hospital, by the nursing sisters—Misses Wilson and Murphy--aided by a donation from the hospital funds. The wards were most tastefully decorated with flags, ropes of coloured paper, &c., helped out by a large number of flowers and quantities of holly and evergreen, the gift of Mrs. Chancellor, an old and valued friend of the sick and disabled of the Edinburgh Garrison. On the walls were words of kindly greeting to Lieutenant-Colonel Hurston, C.M.G., the members of the hospital staff, the ladies of the Corps, and the Nursing Sisters. The use of a piano has been secured to the hospital for a month by the kindness of Mrs. McMicking, wife of Major McMicking, of the Royal Scots. The programme of the concert was well received and many *encores* were called for. Nearly all the officers and ladies stationed in Edinburgh were present.

"MILITARY HOSPITAL, CASTLE, EDINBURGH, N.B.

"PATIENTS' CONCERT, CHRISTMAS EVE, 1909.

"*Programme.*

(1)	*Pianoforte Selection*		Miss O'BRIEN.
(2)	*Song*	Selected	Mr. ENSOR.
(3)	*Mandoline Solo*		Cpl. LANGLEY.
(4)	*Comic Song*	'How dare you'	Lce.-Cpl. TAYLOR.
(5)	*Song*	'Songs of Araby' ..	Serjt. W. DRUMMOND.
(6)	*Duet and Dance*	'Rag-time' ..	Messrs. LINDSAY and AUSTIN.
(7)	*Song*	Selected	Miss SKINNER.
(8)	*Selection*		Messrs. ALEY, GIBSON, LANGLEY and GRAY.
(9)	*Song*	Selected	Miss J. GLEN.
(10)	*Banjo Solo*		Cpl. O'Brien.
(11)	*Song*	'Blind Boy'	Serjt. A. GRAY.

"'GOD SAVE THE KING.'

"*Accompanist*—Miss O'BRIEN.

"(Selections at intervals by Pte. LIDDLE's Gramaphone.)

"After the concert, a number of toys, cakes, sweets, &c., the purchase of which had given several days of strenuous employment to Mrs. Silver and Mrs. Ffrench, were distributed among the women and children of the Corps. Sergeant-Major and Mrs. Hill and several of the senior N.C.O.'s also came in for special gifts. Several very handsome illustrated books and a number of illustrated papers were presented to the patients by Miss Watson, Edinburgh.

"On Christmas day the N.C.O.'s and men had a dinner and smoking concert at the Cathedral Hotel, the accommodation in our historic but highly inconvenient Castle being unsuitable for the purpose. Lieutenant-Colonel Heuston, C.M.G., and Captain Mac Nicol visited the men while at dinner. The former, in a short speech, wished the men a Merry Christmas and said he was glad to be able to congratulate the Company on its efficiency and on the good feeling that existed among all ranks. It is greatly to the credit of the Company that no case of disorderly conduct or offence of any sort resulted from the Christmas entertainments. All returned quietly to barracks and quarters at the conclusion of the Smoker.

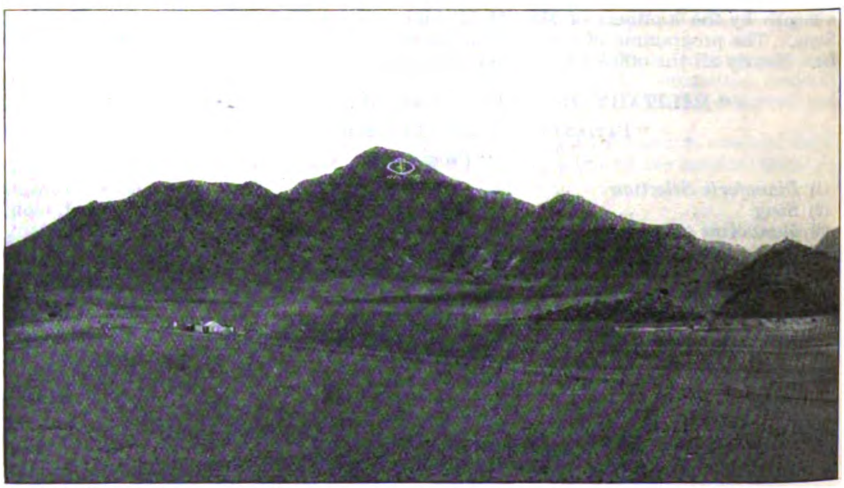
"The finances of the Company are now in such good shape that almost the whole of the expenses of the dinner and concert could be provided for out of its funds—a very small balance being made up by the Officers, and it is practically certain that the funds in 1910 will not only provide the Christmas dinner but permit of other entertainments in the shape of 'Smokers,' &c.

"The Company was the recipient of Christmas cards from numerous Messes, Companies, Royal Army Medical Corps, and friends in all parts of the world. It returned the compliment with a very handsome card, carrying the crest of the Corps, Christmas greeting, a photograph of the Warrant Officer, with some of the N.C.O.'s and men—a very soldierly group.

"On December 29, Mrs. Chancellor, to whom I have referred above, gave a concert and tea to the patients and the married families of the Company. A few other guests, most of whom had made their hostess's acquaintance during a residence in the hospital wards, were invited. Both tea and concert were voted a great success.

"Changes of *personnel* are too numerous to mention in detail. Colonel Corker, our last Principal Medical Officer, has gone to Egypt, and his successor, Colonel Woodhouse is on leave, while Lieutenant-Colonel Heuston, C.M.G., is acting for him. Major Silver is in temporary charge of the hospital. Captains MacNicol and Turner have recently arrived, and a third officer is expected shortly. Lieutenant-Colonel Yarr takes the place of Major Scott as Medical Inspector of Recruits. Our strength of Nursing Sisters has been raised to three owing to the great increase of work in the surgical wards, and Miss Brewer has arrived for permanent duty."

NOTES FROM MIDDELBURG, CAPE COLONY.—Major Clark writes: "As this is probably the last appearance of Middelburg in these pages, we crave space for another view of our badge, showing the commanding position which it occupies. Before



abandoning the hospital at the foot of the hill, the detachment gave the emblem a parting coat of whitewash, but we fear that in a few months the rain and the weather will have deprived the countryside of this dominating landmark.

"As a military station Middelburg is on its deathbed, and it now contains only the few men who are necessary to carry out the final obsequies of what was once an important encampment of all arms. It was not such a black place as it was painted, and there are many soldiers who cherish kindly recollections of it."

NOTES FROM BLOEMFONTEIN.—Lieutenant-Colonel E. J. Erskine Risk writes, December, 1909: "Surgeon-General W. W. Kenny inspected the Military Hospital, Tempe, on his farewell visit on Monday, November 22, and desired to express his appreciation of the appearance of the men on parade, and of the excellent condition in which he found the wards and institutions of the Company. He spoke also to the new draft, pointing out the necessity of undergoing inoculation against enteric fever, with the result that seven-eighths of the men volunteered to undergo this operation. The General Officer Commanding in Chief, Lord Methuen, also visited the Hospital during November, and both he and the Surgeon-General stated that Bloemfontein now possessed the best Military Hospital in South Africa.

"An up-to-date operating theatre is now provided, equipped with an anæsthetist's room, X-ray and photographic dark room, and store room; hot and cold water are laid on, and a high pressure autoclave is installed in the sterilizing room.

"Our mental and prisoners' ward is also nearing completion, and will supply a great want.

"The isolation hospital just completed will be re-appropriated as the new female hospital, and is a very fine building, quite near the north end of the hospital grounds. With a few necessary alterations it will be well suited for its purpose, and will obviate a journey of sick women and children to Naval Hill, a distance of 4 miles. Major Poe, who has just arrived, will be in medical charge, when the old family hospital *personnel* is transferred to it.

"The new military hospital, Tempe, was opened on May 11, 1907, when we moved over from the old No. 8 General Hospital, where the fine building of Grey's College is now erected; the move of our patients was carried out in forty-eight hours, and all were made comfortable in their new quarters. At that time only the three main blocks of wards, kitchen and administration block were *en evidence;* now the hospital enclosure is quite a township; the patients have large, well-lighted and well-equipped wards, with accommodation in special small wards for officers, medical and surgical cases; provision is also made for treatment and isolation of enteric fever and dysentery cases, and there are also wards for the observation of such cases.

"The men of the company have well-arranged barrack-rooms, the nursing orderlies being brigaded together to establish *esprit de corps.* I would suggest that the nursing orderlies be granted a special badge on their arms, to establish them as a *corps d'élite* in the Royal Army Medical Corps, through which branch all higher promotion above Serjeant is alone possible.

"The serjeants are now provided with a billiard table, and sanction has been applied for housing it suitably.

"The men of the company have also a good billiard table, housed well in a suitable room. This and the recreation room with a bagatelle table and games are well patronized, and the men are kept amused in their own barracks. A good grant is made monthly to supplement their messing, and I think they are the best fed unit in the garrison.

"On the medical side the diminution of enteric fever in this garrison is very gratifying to all concerned. In 1904 there were, on a strength of 3,331, 260 cases with 29 deaths, and, with the same strength, each year has showed an improvement, viz.:—

In 1905	52 cases	3 deaths
,, 1906	24 ,,	2 ,,
,, 1907	28 ,,	1 ,,
,, 1908	22 ,,	5 ,,
,, 1909	5 ,,	1 ,,

"And up to December, 1909, no further cases have occurred. Minor septic diseases have also diminished.

"A striking diminution in cases of disordered action of the heart has resulted since the modified and progressive form of gymnastic drill has been introduced into the Army.

"All these results are due to improvements in the sanitary and general environments of the soldier in cantonments, greater care on the part of the officers commanding,

and officers Royal Army Medical Corps in sanitary charge of corps and units, improved municipal water supply, and the water carriage system of drainage introduced recently into the military hospital.

"The 24th Company Royal Army Medical Corps at Tempe has also a well-organized rifle club, with twenty modern rifles on charge, most efficiently run and initiated by our invaluable Serjeant-Major How, who is ubiqutious, active and zealous. Spoon shots take place monthly at different ranges, and cause much rivalry amongst the competitors.

"A silver cup is also competed for annually, and kept by the winning officer, N.C.O., or man in his respective mess or billiard-room. Private Grigg so far is the only winner, beating all the other ranks with a fine score at 200, 500, and 600 yards; he received a silver medal suitably inscribed as a personal souvenir.

"Winners of the monthly spoon shoot are: Quartermaster-Serjeant Renton, Private Smith, Private Cannon (twice), Serjeant-Major How (twice), Privates Watmore and Miles, Captain Lewis, Captain Sampson, Serjeant Bell, Staff-Serjeant Page. At Club Handicaps each winner loses 4 points for each win.

"In consequence of the diminished sickness in the garrison, the number of beds in the military hospital have been reduced from 200 beds in the old No. 8 General Hospital, to 80 beds in the present new hospital, and the charge pay correspondingly, thus producing a large financial saving to the treasury."

NOTES FROM SIERRA LEONE.—Major F. J. W. Porter, D.S.O., writes: "The Officers Royal Army Medical Corps gave their Annual Gymkhana, at King Tom, on December 7, and people have been kind enough to say it was a great success. Captain O'Donoghue was responsible for the arrangements connected with the events, and did his work remarkably well. Captains Lauder, Parsons and Cuthbert (the only other officers at present in Freetown) rendered able assistance.

"The programme of events was printed by Gale and Polden and was greatly admired:—

"PROGRAMME OF EVENTS.

"(1) *Potato Sticking from Hammocks.*—Points to be given for pace. Pairs of lady and gentleman. Two prizes; also prizes for hammock boys of the winning teams.

"(2) *Costume Race.*—The lady to provide a comic costume for her partner, who runs 50 yards in the same. Two prizes. The most comic costume will win the lady's prize.

"(3) *Menagerie Race.*—Open to ladies and gentlemen. A prize to the first lady and first gentleman. Competitors to bring their own animals.

"(4) *Blindfold Driving Obstacle Race.*—Pairs of lady and gentleman. Prize to lady.

"(5) *Blackboard Animal Drawing Competition.*—Prize to winning lady.

"(6) *Hammock Race.*—For gentlemen. One prize. Prize to boys of winning team.

"(7) *Band Race.*—First Prize, 6s. Second Prize, 4s. Third Prize, 2s. 6d.

"N.B.—Entries on the ground. No one to win more than two prizes.

"The Menagerie Race was very popular and an extraordinary variety of animals competed. Crocodile, pig, fowl, duck, lizard, monkey, guinea-fowl, bandicoot were at the starting point. The bandicoot was an easy first, and the guinea-fowl a good second. The Blindfold Driving Obstacle Race created great amusement; one of the competitors producing roars of laughter by his well-simulated action as a spirited pony. The Hammock Race was probably the most exciting event of the day; twelve teams competed, and the pace at which the race was run was perfectly extraordinary. It was won by Colonel Graham, D.S.O., who is at present Officer Commanding Troops.

"The weather was very cool, and at this time of the year one had not to fear the possibility of the 'At Home' being ruined by a tornado.

"The N.C.O.'s and men of the Royal Army Medical Corps gave their services at the refreshment tables and in this way helped to make the gymkhana a success.

"The prizes were obtained from the Army and Navy Stores and were distributed by Master Porter.

"The Band of the 2nd Battalion West India Regiment rendered a nice selection of music during the afternoon."

1.	*March*	'Washington Post'	*Sousa*
2.	*Overture*	'William Tell'	*Rossini*
3.	*Waltz*	'Blue Danube'	*Strauss*
4.	*Selection*	'Yeomen of the Guard'	*Sullivan*
5.	*Egyptian Serenade*	'Amina'	*Lincke*

6. *Selection*	.. .. ..	'Our Miss Gibbs'	.. .. *Caryll*
7. *Intermezzo*	.. .. ..	'My Lady Gracious'	.. .. *Monteith*
8. *Two-Step*	.. .. ..	'Mumblin' Moss'	.. .. *Thurban*

"God Save the King."

NOTES FROM HONG KONG.—Major Probyn writes: "The trooping season is now over for China; during the last few weeks two transports have been lying in our beautiful harbour adding, if possible, to its picturesqueness—H.M.T. 'Soudan' (P. and O. Co.) and H.M.T. 'Rewa' (B.I.S.N. Co.)—the former bringing out eight members of the Queen Alexandra Imperial Military Nursing Service, who grace this station for the first time with their presence, as up to date the nursing has all been done in a very creditable manner by the orderlies of the Royal Army Medical Corps. They are as follows: Matron, Miss L. W. Tulloh, R.R.C.; Sisters F. G. P. Stourdza Zrinyi, H. M. Drage, L. M. Toller; Staff Nurses M. E. Brewer, E. A. Harvey, A. J. St. Clair, M. S. Williams.

"The 'Soudan' arrived on October 23, having on board the Royal Inniskilling Fusiliers from Malta who were bound for Tientsin, and were in rather a hurry to get there as the ports would soon be closed for traffic on account of the ice; this actually occurred two years ago when the Cameron Highlanders, who are now to be relieved, had to stay in Hong Kong some three months. The transport was to proceed north on the 25th, but as there was a typhoon blowing, she was delayed until the following day. The ship returned to Hong Kong on November 9, conveying the Cameron Highlanders for India, with Major J. Thomson, Captain E. W. Sibbery and Lieutenant C. McQueen, doing the medical duty in the round trip from Southampton to South Africa *via* Bombay. The 'Soudan' left here on November 20. The 'Rewa,' which was also delayed one day owing to a typhoon, left early on November 18, carrying to the United Kingdom details and invalids; amongst the former was Lieutenant-Colonel J. M. Reid, M.D., Captain P. H. Collingwood, Lieutenant and Quartermaster J. Glennon and Serjeant-Major A. Fowler, the two last named we regret to say going on the retired list. The following N.C.O.'s and men also left: Corporal R. H. Bennett, Lance-Corporal Byrne, Lance-Corporal F. G. Fuller, Private J. Hart, Private T. Waters, and Private W. Wardale.

"Lance-Corporal E. Barr was to have proceeded by the 'Rewa,' but he volunteered to go on the 'Soudan' in place of Private W. Davies who was doing trooping duty on the 'Soudan,' but was invalided home on 'Rewa.'

"We have to welcome Lieutenant-Colonel Sir Joseph Fayrer, Bart., M.D., and Lady Fayrer, also Captain A. D. Waring, M.B., and Serjeant-Major E. Edser, with the following N.C.O.'s and men: Corporal W. C. Prince, Corporal W. Whitehead, Lance-Corporal C. Harlen, Lance-Corporal H. Welsh, Private J. W. Jones, Private Davies, Private G. O. Triebwasser, Private A. H. Wilks, Private H. A. Claridge, Private T. F. Corbett and Private A. Gibson.

"The 'A' team of 27th Company met the 'B' team in a cricket match at the Happy Valley on November 10. There was only time for one innings, as the shades of night soon blot out the necessary illumination at this period of the year. The playing showed that we have some worthy successors to wield the willow in our new draft. The scores were as follows:—

'A' Team.

Serjt.-Major Fowler, c. Serjt.-Major Edser, b. Corporal Huggett	3
Private Corbett, c. Waters, b. Corporal Huggett	8
Corporal Wills, not out	35
Lance-Corporal Barr, b. Corporal Huggett	7
Private Walker, b. Corporal Huggett	0
Private Crooke, c. Corporal Bennett, b. Corporal Huggett	0
Sapper Grant, R.E. (att.), b. Corporal Huggett	0
Corporal Whitehead, st. Corporal Bennett, b. Corporal Huggett	0
Captain Craig, l.b.w. b. Serjeant Warsop	15
Private Claridge, c. Lance-Corporal Harlen, b. Serjeant Warsop	0
Private Jones, st. Corporal Bennett, b. Serjeant Warsop	0
Serjeant Butler, b. Waters	4
Extras	5
Total	77

'B' Team.

Lieutenant-Colonel Fayrer, c. Walker, b. Corporal Wills	23
Corporal Bennett, c. Serjeant Butler, b. Walker	3
Serjt.-Major Edser, b. Corporal Wills	1
Corporal Huggett, b. Corporal Wills	0
Serjeant Warsop, b. Walker	3
Corporal Cole, b. Corporal Wills	2
Private Waters, st. Lance-Corporal Barr, b. Walker	4
Corporal Prince, b. Corporal Wills	3
Lance-Corporal Harlen, b. Corporal Wills	13
Serjeant Strange, b. Corporal Wills	1
Private Wallace, b. Corporal Wills	2
Private Carroll, not out	3
Extras	8
Total	66

"On November 11 the new draft 'The Aviators,' and the homegoing 'Bully-beef' draft were entertained at dinner and afterwards at a smoking concert at Bowen Road Hospital, which was attended by several of the officers. The departing Serjeant-Major (Serjeant-Major A. Fowler) was the recipient of two handsome tokens of the esteem and respect in which he was held by the members of the Company who gave him a most hearty 'God speed' on his retirement to civil life. The N.C.O.'s presented him with two beautiful Japanese panels, whilst the N.C.O.'s and men gave him a handsome Chinese épergne.

"At Hong Kong the distribution of officers is as follows: Colonel W. G. A. Bedford, C.M.G., M.B., Principal Medical Officer; Lieutenant-Colonel Sir Joseph Fayrer, Bart., M.D., Officer in charge Military Hospital, Victoria; Major S. Macdonald, M.B., Officer in charge Military Hospital, Kowloon; Major P. J. Probyn, D.S.O., M.B., Specialist, Sanitary Officer and Company Officer; Captain A. D. Waring, M.B., Lieutenant W. J. E. Bell, M.B., and Lieutenant H. M. J. Perry, doing duty at Military Hospital, Victoria, whilst Captain B. A. Craig is in charge of Staff, Departments and Married Families."

NOTES FROM CALCUTTA.—Lieutenant-Colonel R. S. F. Henderson, R.A.M.C., Secretary to Principal Medical Officer, H.M.'s Forces in India, writes as follows, dated December 14, 1909:—

"*Leave.*—Following officer is granted extension of medical certificate leave ex-India:—

"Captain C. T. Edmunds, from December 11, 1909, to April 10, 1910."

SPECIAL RESERVE OF OFFICERS.

ROYAL ARMY MEDICAL CORPS.

Supplementary List.

George Henry Usmar (late Lieutenant Royal Army Medical Corps) to be Lieutenant, with seniority as from August 24, 1908, dated October 29, 1909.

The undermentioned to be Lieutenants (on probation):—

John Inkster, M.B., dated November 24, 1909.

Ian Dunbar Dickson, John McGregor Scott, Thomas Errol Guthrie, William Thomson Graham, Charles Stewart Sandeman, dated December 17, 1909.

The undermentioned to be Lieutenants (on probation):—

Gordon Reginald Ward, dated November 26, 1909.

Ronald MacKinnon, M.B., dated December 7, 1909.

The undermentioned to be Lieutenants (on probation):—

Philip Walter Matthew, Aston Ridley Dale, dated November 29, 1909.

The undermentioned to be Lieutenants (on probation):—

Mark Anthony, dated December 5, 1909. Edward Holmes Rainey, dated December 10, 1909.

TERRITORIAL FORCE.

WAR OFFICE,
January 4, 1910.

The King has been graciously pleased to confer the Territorial Decoration upon the undermentioned officers of the Territorial Force who have been duly recommended for the same under the terms of the Royal Warrant, dated August 17, 1908:—

Surgeon-Major and Honorary Surgeon-Lieutenant-Colonel Herbert Paget Tayler, M.B., 4th Battalion, The Duke of Edinburgh's (Wiltshire Regiment).

Lieutenant-Colonel Frederic Joseph Knowles, Royal Army Medical Corps, 1st West Lancashire Field Ambulance.

Lieutenant-Colonel Alexander Dryden Moffat, R.A.M.C., 2nd Lowland Field Ambulance.

Major William Brown, attached to the Northumberland (Fortress) Royal Engineers.

Major and Honorary Surgeon-Lieutenant-Colonel Frederick Vasey Adams, attached to the 5th Battalion, The Cameronians (Scottish Rifles).

Lieutenant-Colonel and Honorary Surgeon-Colonel David Lennox, M.D., attached to the 4th (City of Dundee) Battalion, The Black Watch (Royal Highlanders).

War Office,
January 12, 1910.

The King has been graciously pleased to confer the Volunteer Officers' Decoration upon the undermentioned officers, who have been duly recommended for the same under the terms of the Royal Warrant, dated July 25, 1892.

Territorial Force.

Wessex Divisional Engineers, Royal Engineers.—Surgeon-Major Joseph Fuller (retired).

4th Battalion, the Prince of Wales's Volunteers (South Lancashire Regiment).—Surgeon-Major Joseph Adams, M.B.

6th Battalion, the Manchester Regiment.—Surgeon-Major George Henry Darwin (retired).

3rd Wessex Field Ambulance, Royal Army Medical Corps.—Lieutenant-Colonel Harry Munyard Brownfield (retired).

Volunteers.

1st Devonshire Royal Garrison Artillery (Volunteers).—Surgeon-Lieutenant Arthur Goulston (retired).

The Tay Division (Electrical Engineers) Royal Engineers (Volunteers).—Surgeon-Major George Owen Carr Mackness, M.D. (retired).

4th Volunteer Battalion, the Norfolk Regiment.—Surgeon-Major and Honorary Surgeon-Lieutenant-Colonel (Brigade-Surgeon-Lieutenant-Colonel, Senior Medical Officer, Norfolk Volunteer Infantry Brigade) Charles Arthur Owen Owens, M.D. (retired).

2nd (Berwickshire) Volunteer Battalion, the King's Own Scottish Borderers.—Surgeon-Major Samuel Macvie, M.B. (retired).

2nd Volunteer Battalion, the Highland Light Infantry.—Surgeon-Major Walter Sandeman, M.B. (retired).

TERRITORIAL FORCE.

Royal Army Medical Corps.

5th London Field Ambulance.—Captain Ernest B. Dowsett to be Major, dated December 22, 1909.

3rd Lowland Field Ambulance.—Lieutenant Henry A. Leebody, M.B., to be Captain, dated November 19, 1909.

2nd West Riding Field Ambulance.—Francis George Dobson to be Lieutenant, dated November 13, 1909.

3rd Wessex Field Ambulance.—Leslie Rawes to be Lieutenant, dated November 10, 1909.

Attached to Units other than Medical Units.

Captain Henry W. Williams, M.B., resigns his commission, dated September 17, 1909.

Lieutenant Hugh K. Lacey resigns his commission, dated November 7, 1909.

For attachment to Units other than Medical Units.

Surgeon-Lieutenant-Colonel and Honorary Surgeon-Colonel John Adam, M.D., from the 1st (Ross Highland) Volunteer Battalion, Seaforth Highlanders (Ross-shire Buffs, the Duke of Albany's), to be Lieutenant-Colonel, with the honorary rank of Surgeon-Colonel, with precedence as in the Volunteer Force, dated April 1, 1908.

Royal Garrison Artillery.

Cornwall (Duke of Cornwall's).—Surgeon-Lieutenant Edwyn G. Andrew, to be Surgeon-Captain, dated October 5, 1909.

7th and 8th Battalion (Leeds Rifles), the Prince of Wales's Own (West Yorkshire Regiment.—Surgeon-Captain Alexander Mackenzie, M.B., resigns his commission, dated November 20, 1909.

Graham Lauder Watson to be Second Lieutenant, dated November 22, 1909.

ROYAL ARMY MEDICAL CORPS.

1st South Midland Mounted Brigade Field Ambulance.—Douglas Martin Spring, M.B., to be Lieutenant, dated October 30, 1909.

Yorkshire Mounted Brigade Field Ambulance.—George Scott Williamson to be Lieutenant, dated November 1, 1909.

3rd London (City of London) Field Ambulance.—Supernumerary Lieutenant Reginald M. Vick is restored to the establishment, dated December 8, 1909.

2nd Lowland Field Ambulance.—Lieutenant James K. Patrick, M.B., to be Captain, dated December 8, 1909.

1st North Midland Field Ambulance.—Lieutenant Edwin A. Wraith to be Captain, dated November 26, 1909.

2nd North Midland Field Ambulance.—Major William P. Peake to be Lieutenant-Colonel, dated November 5, 1909.

1st South Midland Field Ambulance.—Lieutenant George W. Craig to be Captain, dated October 8, 1909.

3rd Northern General Hospital.—Major William S. Porter, M.D., to be Lieutenant-Colonel, dated April 18, 1909.

Attached to Units other than Medical Units.

Lieutenant David H. Weir, M.D., to be Captain, dated August 10, 1909.

Captain Hugh N. A. Taylor, M.D., is restored to the establishment, dated September 6, 1909.

Lieutenant Henry Goudie to be Captain, dated November 5, 1909.

Captain Charles A. Goullet to be Major, dated December 5, 1909.

For attachment to Units other than Medical Units.

Surgeon-Lieutenant-Colonel and Honorary Surgeon-Colonel Francis John Walker, M.D., from the 5th Battalion, the Lincolnshire Regiment, to be Lieutenant-Colonel, with the honorary rank of Surgeon-Colonel, dated September 1, 1909.

6th Renfrewshire Battalion, Princess Louise's (Argyll and Sutherland Highlanders).—Surgeon-Captain Wallace A. Pride, M.B., resigns his commission, dated December 6, 1909.

ROYAL ARMY MEDICAL CORPS.

3rd West Lancashire Field Ambulance.—Captain Claude W. S. Saberton, M.B., resigns his commission, dated November 27, 1909.

2nd Lowland Field Ambulance.—Quartermaster and Honorary Captain William Lee is granted the honorary rank of Major, dated December 10, 1909.

1st South Midland Field Ambulance.—Lieutenant Seymour G. Barling to be Captain, dated December 8, 1909.

3rd Welsh Field Ambulance.—Captain David L. Davies, M.B., resigns his commission, dated December 1, 1909.

1st Northern General Hospital.—Roden Horace Powlett Orde to be Quartermaster, with the honorary rank of Lieutenant, dated January 1, 1910.

2nd Southern General Hospital.—Major Arthur L. Fleming resigns his commission, dated November 27, 1909.

Attached to Units other than Medical Units.

Lieutenant Walter Fitzpatrick to be Captain, dated October 28, 1909.

Captain William T. Hannah, M.D., to be Major, dated December 2, 1909.

ROYAL ARMY MEDICAL CORPS.

1st Highland Field Ambulance.—Major Ashley W. Mackintosh, M.D., resigns his commission, dated December 8, 1909.

2nd Wessex Field Ambulance.—David Macnair to be Lieutenant, dated December 3, 1909.

Attached to Units other than Medical Units.

Captain and Honorary Surgeon-Major Charles S. de Segundo, M.D., to be Major, dated July 2, 1909.

Lieutenant Frederick Philip, M.B., to be Captain, dated December 2, 1909.

NOTES FROM THE LONDON DISTRICT.

Conditions of Service in the Royal Army Medical Corps Special Reserve.

An Address to the Students of St. Thomas's Hospital,
by Major S. Guise-Moores, R.A.M.C.

Gentlemen,—I have been asked by Sir Alfred Keogh, the Director-General Army Medical Service, and with the consent of your Dean, to address you on the conditions of service in the Special Reserve, Royal Army Medical Corps. My object is to try and persuade young medical men to accept commissions in the same. As an old St. Thomas's man, you will readily understand what a pleasure it is to have the privilege of addressing you.

This Special Reserve is designed to provide the medical officers necessary to complete the war establishments of the Royal Army Medical Corps, and, in addition, to ensure a sufficiency for such wastage as war entails. Let me state at the outset that by joining this Reserve it will not enable you to gain a commission in the regular forces of the Royal Army Medical Corps, except when an officer belonging to it is called out for service at a time of national emergency. At such a time, should he so desire, "he will be eligible, under conditions to be laid down by the Army Council, to a commission in the Regular Forces, provided that, at the time of being so appointed, he is not over 30 years of age if a subaltern, or 40 years if of higher rank."

The Royal Army Medical Corps Territorial Forces and this Special Reserve are distinct and separate organisations. The former serve at home only, and are primarily maintained to resist invasion, whereas this Special Reserve is intended for service abroad if necessary. To my mind, an officer of this Reserve is much more likely to be engaged in an invasion resistance than in that of a war outside the United Kingdom.

You may ask, Why not keep the Royal Army Medical Corps regular establishment up to such strength as will ensure independence of extraneous aid? Think what the upkeep of a war strength in peace time would mean to the taxpayer; besides, there is no reason for it, if a system can be elaborated by which we can have trained medical officers in reserve, to fulfil all requirements. In case of general mobilisation, the Royal Army Medical Corps must have medical men to fill the gaps in field units, and a sufficient reserve to fill the vacancies occasioned by war's greater demands.

This being the case, where are these medical men, trained as we would wish them to be, to come from?

There is, of course, the alternative of employing civil surgeons, as was done in the late South African, and other wars. These gentlemen were given no military status; they were civilians pure and simple, and, as such, could not exercise command over the rank and file doing duty in the units of the medical service, or of patients in hospitals. This negation of authority proved unsatisfactory to the Army generally, and to the civil surgeons in particular. The medical men, therefore, must possess all the powers and status that rank brings with it if efficiency is to result. His Majesty the King, by signing your commission on joining the Reserve of officers, confers on you rank and status, enabling you to become on mobilisation, for the time employed, a "Regular" officer, with all advantages accruing therefrom. To speak candidly, administrative medical officers prefer medical men serving with an army in the field to hold a commission; it enables them to assume military responsibility, and invites general confidence.

In war there are two classes of "persons," the soldier proper and the camp followers; as far as military law and usage is concerned the civilian comes under the latter category.

Civil surgeons have had (not from choice, but by force of circumstances) duties of a military nature to perform other than the actual treatment of sick and wounded. Duties requiring the preservation of discipline, which could not be carried out and maintained authoritatively, without the magic badges of rank that an officer wears.

For instance, it has often happened that the civil surgeon has been placed in nominal command of a convoy of troops travelling from front to base on a long line of communications. Sick soldiers journeying along such a "line" often rapidly recover, or in any case recover sufficiently to get out of hand. I well remember a civil surgeon coming to me in despair over his unruly patients. He had gone so far as to even lock his sick into railway carriages, yet they escaped at the various rest stations and camps *en route* to the base. He had no authority to place men in arrest; he had no power to punish defaulters; he could only feebly expostulate with the N.C.O's. in subordinate charge, curse his luck, and on his arrival at the base give the excuse for his diminished convoy that the men knew he was not an officer, and had presumed on the same. The

next occasion I met my friend (also again with a sick convoy) he had borrowed a coat with badges of rank on it; his difficulties had now vanished into space.

We maintain, therefore, without fear of contradiction, that in dealing with soldiers a medical man's utility is greatly extended if he holds the King's commission and has, in addition, some knowledge of military procedure and administration.

An exception must, of course, be made to consultants appointed to serve with the headquarters of an army; their duties would be purely those of consultant physicians and surgeons. Such men as the late Sir William MacCormac and Mr. Makins, who both gave up lucrative consulting practices to serve in South Africa, must perform duties solely consultative in character.

In inviting you to accept commissions in the Royal Army Medical Corps Special Reserve we fully recognise that medical men cannot always spare the time for extensive military training. Nor do we think this necessary. Being "qualified" men, all that is necessary is for them to undergo instruction in administration of the Army generally, and in the medical service in particular.

Let us now consider the conditions in detail which will enable you to join this Special Reserve of officers. They are as follows :—

A candidate must not be over 30 years of age at the time of his appointment, and must be registered under the medical acts in force. If he fulfils these requirements and is desirous of obtaining a commission in this Special Reserve, he must submit an application on the special form.

A certificate of moral character, given by your Dean, is a necessary accompaniment to the above application.

These documents are to be forwarded to the Secretary of the War Office, London. Following close on their receipt will come an order to the candidate to present himself for medical examination as to physical fitness at the nearest military station to his home. A would-be officer of the Special Reserve Royal Army Medical Corps, like every other officer holding his Majesty's commission, has certain liabilities. These he should be cognisant of. "He is liable to be called up for service at home or abroad; either with his corps, or otherwise, at a time of great emergency, when the Army Reserve is called out, until his services are no longer required." This liability in peace time is for one year only from the date of completion of the probationary period. It can be renewed annually up to the age of 40. Should an officer wish to terminate his liability he can do so by notifying the same one month before the termination of any year of service. If in any particular instance the empressment of this rule is found to deal hardly with, or to act prejudicially against, an officer's professional prospects, and is so represented, the case will receive the consideration of the Army Council.

On the candidate being accepted he will be appointed a lieutenant on probation, and will be required to undergo a three months' course of instruction at the Depôt Royal Army Medical Corps at Aldershot. This course may be considerably shortened, as will be pointed out later on.

Classes assemble twice yearly, but intending candidates may apply to enter on a probationer's course at any time most convenient to themselves.

Once a candidate is accepted by the War Office he becomes entitled to a gratuity of £20 for outfit, uniform, &c., but should he fail from any cause to complete his period of engagement for four years' service in this Special Reserve he will refund one quarter of the gratuity for each year by which he falls short of such period.

The pay allowed during this three months' course is 14s. a day. The allowances are 1s. a day for a servant—if no servant is provided—and 3s., nearly, a day lodging allowance if not provided with Government quarters, the whole making a total of nearly 18s. per diem.

The three months' preliminary training includes, amongst other subjects, squad and company drill, and stretcher and ambulance wagon drill. The candidate is also taught the interior economy of the Corps, including pay and clothing of the men; sanitation in the field and in barracks; hospital administration and military law. Military horsemanship is optional.

The preliminary training is very largely an outdoor life. It is strenuous whilst it lasts, but there is leisure for participation in the many games and pastimes that Aldershot affords. The Officers' Club provides cricket, tennis, polo, &c., in summer, and in winter football, hockey, beagling, and rinking. There are also racquet and fives courts in both camps, and rough shooting is obtainable over the Government preserves.

The time that usually intervenes between qualifying and settling down in practice could not be better filled than in undertaking such duties as I have attempted to out-

line. Duties which must have a marked effect for good, physically and mentally, at a time of recent emancipation from the laboratory and examination hall, and at a time when a young medical man's powers of resistance to microbic invasion must be at their lowest ebb.

At the end of the three months' probationary period an inspection or examination (not formal or written) is held by the principal medical officer, and certificates of proficiency presented to officers.

The certificate gained, all is plain sailing. The former aspirant to a commission has now reached his goal, and becomes a full-blown Lieutenant R.A.M.C., Special Reserve.

When he has three and a half years' service he is eligible to qualify for promotion to the rank of captain. To pass the necessary examination for this step a further four weeks' training is required. This training may take place at the Headquarters Hospital of the command in which the officer resides.

The pay whilst on this training is the same as that allowed on the probationary course, plus 4s. a day extra for messing, making a total of nearly 22s. a day.

The Special Reserve Officer is entitled to a gratuity of £20 a year for each year that he remains in the Reserve until he is 40 years of age. Supposing an officer is commissioned at 25, and remains in the Reserve till 40, he has during those years taken £20 × 15 = £300.

Government gets in return four months' training, and pays the officer during that time an average of £1 per diem in order to secure his services at a time of national emergency. Civil surgeons gave their services in South Africa at a time of imminent national danger without having received any retaining fees, and medical men of the highest social and professional standing are at the present moment filling positions as officers in our Territorial medical organisation gratuitously. This fact reflects lasting credit on themselves and their profession.

If the "Reserve" officer wishes to withdraw at any time he can do so by giving a month's notice, the liability to serve and the £20 gratuity ceasing together.

After completing this second training, promotion to the rank of captain follows.

The rank of major is reached automatically on the completion of twelve years' service, without further training or examination.

Officers of this Special Reserve will be employed in preference to any civil surgeon should there be a vacancy in any military station for additional medical services and a full pay officer is not available.

Should war supervene, and it became necessary to call up the Reserves, then the services of the officer R.A.M.C. Special Reserve might possibly be required. He might then (according to rank) be placed in medical charge of a regiment or battalion, or with a field ambulance, clearing, stationary, or general hospital. He becomes, in fact, for the time being, a "Regular" officer, receiving exactly the same pay, allowances, and privileges, according to rank, as the colleagues he now joins.

To enable the Special Reserve officer called up to meet any extra expenses, Government allows as compensation for disturbance, and to provide for any extra outfit required, £50.

On the cessation of hostilities a similar sum is given.

Soldiering under active service conditions might possibly unsettle a man and foster a taste for more permanent militarism; if so, the War Office steps in, and offers a commission in the Regular R.A.M.C. In that case, a lieutenant under 30 years of age and a captain under 40 is eligible to hold one. We have many civil surgeons now in our ranks who are qualifying for colonel's pensions of £600 a year, and surgeon-general's pensions of £730 per annum, and who may even carry a director-general's salary of £2,000 a year in their cross-belt pouches.

So far we have only considered the means by which a fully qualified man may obtain a commission in our Special Reserve. We must not, however, forget the fact that a medical student can obtain admission into this Reserve on certain less exacting and more advantageous terms. This is done by joining any one of the various officers' training corps, shortly called O.T.C., and obtaining certain certificates therein, called certificates "A" and "B." Certificate "A" may be gained whilst a member of the Junior (Public School) Division of the O.T.C., or the same certificate, plus certificate "B," may be obtained in any O.T.C. connected with a University. The University of London O.T.C. is the most convenient for London students.

It is gratifying to see that "B" section of the medical unit of the University of London O.T.C. contains many St. Thomas's men: and it is hoped that many more may see their way to join the Special Reserve of Officers Royal Army Medical Corps through that channel.

If armed with a professional qualification and certificates "A" and "B," the candidate for a commission in our Special Reserve will shorten his preliminary training at Aldershot by six weeks. Should certificate "A" alone be obtained, then fourteen days' reduction in time is allowed.

The advantages gained by the O.T.C. student are these:—

(i.) An additional gratuity of £35 is granted.

(ii.) Commissions are antedated three months earlier than those of the "original" Special Reservist.

So the certificated O.T.C. student enrolled for the Special Reserve gets, immediately he qualifies professionally, the double concession of a better gratuity and seniority in the service.

It has been epigrammatically said that "there are two forces which cause modern England to move: a crisis and a craze." The craze has come and gone with the recent Territorial boom; the crisis may yet come. Those who incline their ears in the direction of the European Continent must hear the thud of the shipwright's hammer reverberating through space as keel after keel is being laid down with almost miraculous haste and by superhuman effort. What for? To float a fleet which shall challenge our naval supremacy—and that at no distant date. If command of the sea should be lost, our shores become open to invasion by a numerous, scientifically trained, and determined enemy. If such happens, will each one of us be able to conscientiously say that we have done our duty by having become an efficient factor for utilisation at "a time of imminent national danger or great emergency?"

QUEEN ALEXANDRA'S IMPERIAL MILITARY NURSING SERVICE.

The following ladies have received appointments as Staff Nurses: Miss F. L. Trotter, Miss E. L. Murray, Miss G. M. Griffiths, Miss J. Todd, Miss D. Turner, Miss M. M. Davies, Miss M. McNaughtan.

Postings and Transfers.—Matrons: Miss A. A. Murphy, to South Africa, from Chatham. Sisters: Miss E. Barber, to Devonport, on return from Gibraltar; Miss A. B. Wohlmann, to Cambridge Hospital, Aldershot, from Tidworth; Miss M. O. C. McCreery, to Gibraltar, from Malta. Staff Nurses: Miss J. D. C. McPherson, to Tidworth, on appointment; Miss E. S. Killery, to Cosham, on appointment; Miss E. Lowe, to Cambridge Hospital, Aldershot, on appointment; Miss E. G. Barrett, to T.S. "Plassy," for duty, from London; Miss A. S. Siddons, to T.S. "Plassy," for duty, from Netley; Miss S. W. Wooler, to T.S. "Plassy," for duty, from Colchester; Miss A. R. Sibbald, to South Africa, from Cosham; Miss V. L. Batteson, to South Africa, from Military Hospital, Tidworth; Miss G. M. Bennet, to Dover, from Devonport; Miss E. K. Parker, to Hounslow, from Cosham; Miss E. A. Rutherford, to Dover, from London; Miss F. E. Manfield, to Egypt, from Netley; Miss J. Todd, to Woolwich, on appointment; Miss M. M. Davies, to Colchester, on appointment; Miss E. L. Murray, to London, on appointment; Miss G. M. Griffiths, to London, on appointment; Miss F. L. Trotter, to London, on appointment; Miss D. Turner, to Devonport, on appointment; Miss M. McNaughtan, to Cambridge Hospital, Aldershot, on appointment.

Appointments Confirmed.—Miss W. E. Eardley, Miss M. G. C. Foley.

Arrivals.—Miss M. C. S. Knox, R.R.C., Matron, from South Africa; Miss C. Hutton Potts, Matron, from South Africa; Miss R. Osborne, Sister, from South Africa; Miss E. Barber, Sister, from Gibraltar; Miss M. M. Blakely, Sister, from Egypt.

THE LATE MAJOR J. C. WEIR, R.A.M.C.

A NOTE BY LIEUTENANT-COLONEL H. N. THOMPSON, D.S.O., R.A.M.C.

THE news of the sudden death of this Officer from cholera, while on the journey from Darjeeling to Calcutta, came as a very painful shock to all at Lucknow, on December 20 last.

He was returning here after inspecting, as Divisional Sanitary Officer, the site of a proposed new cantonment for Gurkhas, near Darjeeling, was seized with cholera in the train, and died on the boat while crossing from Saraghat to Railway Station, Saraghat.

Major Weir was a very exceptional man. Naturally of a most retiring, modest disposition, if he had a fault it was that he hid his own light most carefully under a

bushel. To those who had the privilege of knowing him intimately, his was a most fascinating and lovable personality. A brilliant classical scholar, and a deep thinker and reader, a conversation with him on any general subject was an intellectual treat. He was of the perfect type of gentleman, the soul of truth and honour, and sensitive to a degree for others; one could never imagine him even thinking of anything mean or common. His personal charm was such, that by all his brother officers here he was looked upon with a singular devotion, and they loved to see him in the mess, and to work in his laboratory. His influence and example were priceless. He loved soldiers, too, and often spoke to me of looking forward to the time when he could give up his special line and be again in personal touch with the men. To me, who have been intimate with him since boyhood, he was more than an ordinary brother; always the loved, trusted, and faithful friend, his advice, sympathy, and companionship were priceless. I almost shudder to think of the future here without him. The Service has lost in him a very brilliant and very valuable officer. His work on the Malta Fever Commission alone must be well known, and, no doubt, appreciated at headquarters. Here he was untiring in the battle of prevention, and it seems the very acme of cruel, fateful irony that dear little Jimmy Weir should be carried off thus by one of those dire diseases, fighting which he had spent so many of the best years of his life. He will not soon be forgotten at this station. The new laboratory at the hospital, which is on the verge of completion, and in which he took such a keen interest, is to be called after him, and is to have a memorial brass sacred to his memory.

UNITED SERVICES MEDICAL SOCIETY.

The next meeting of the above-named Society will be held at the Royal Army Medical College, Millbank, S.W., on Wednesday, February 9, 1910, at 8.30 p.m., when a paper will be read by Major F. J. Wade-Brown, R.A.M.C., on "Medical Staff Rides."

ROYAL ARMY MEDICAL CORPS FUND.

PROCEEDINGS OF A COMMITTEE MEETING HELD AT THE WAR OFFICE, AT 2.30 P.M., ON TUESDAY, JANUARY 18, 1910.

Present.

Surgeon-General W. L. Gubbins, C.B., M.V.O., in the chair.
Colonel Sir James Clark, C.B., Bart.
Colonel D. Wardrop, C.V.O.
Colonel A. Peterkin.
Lieutenant-Colonel E. O. Wight.
Major C. G. Spencer.
Major E. T. F. Birrell.

(2) The Minutes of the last meeting were read and confirmed, but before confirmation Colonel Peterkin raised the question with reference to Minute 11 of the Constitution of the Committee; after some discussion, it was resolved that the reconstruction of the Committee should be considered at the next meeting.

(3) *Band.*—The Aldershot Band Accounts, which are attached to these Minutes, were considered and passed, and a sum of £81 was voted towards the current quarter's expenses.

(4) *General Relief.*—It was noted that the following subscriptions were received from Companies for the General Relief Fund, during the past quarter:—

No. 2 Company	Aldershot	£5	0	0
,, 9 ,,	Colchester	1	0	0
,, 10 ,,	Chatham	3	0	0
,, 12 ,,	Woolwich	2	10	0
,, 13 ,,	Edinburgh	7	12	9
,, 18 ,,	London	5	0	0
,, 25 ,,	Bermuda	5	2	0
,, 27 ,,	Hong Kong	3	9	9

(4) The grants made from the General Relief Fund for the past quarters were considered and confirmed, and a list of the recipients is attached to these Proceedings. A special case for the advance of a sum of money to enable a N.C.O., married off the strength, to take his wife and family abroad, was fully considered and refused, as it was considered a bad precedent to establish, and similar cases have previously been rejected.

(5) The question of granting an Imprest allowance from the General Relief Fund to the principal medical officers of Aldershot and London to enable them to give small assistance to urgent cases of distress was considered, and it was resolved that an amount not exceeding £5 might be advanced for this purpose on the following conditions:—

(*a*) That it is to be used for giving small amounts not exceeding 10s. to urgent cases.

(*b*) That it is not to be repeated to the same individual within two months' intervals, but cases requiring further assistance should be referred, as at present, to the Secretary.

(*c*) That ten days before the end of each quarter a statement of expenditure should be sent to the Secretary.

(*d*) That all cases likely to require more than 10s. within two months shall be dealt with as at present.

(6) A list of the total grants from companies for the past year was then considered, and the Secretary was directed to write to the officer commanding some of the companies, inviting their attention to the smallness of their subscriptions. This list is appended to these Minutes.

(7) *Accounts.*—The half-yearly accounts having been duly audited, were considered and approved, and are published herewith.

(8) The attached Report of the Sub-committee appointed to decide as to what old correspondence could be destroyed, was approved.

(9) *Committee.*—Lieutenant-Colonel E. M. Wilson, C.B., C.M.G., D.S.O., having consented to serve on the Committee, was appointed to fill the vacancy of Retired Pay Officer, *vice* Colonel Sir James Clark, C.B., Bart., whose four years in office has expired.

(10) *Auditor.*—The Secretary was instructed to ask Lieutenant-Colonel R. J. S. Simpson, C.M.G., if he will fill the vacancy of Auditor, *vice* Lieutenant-Colonel A. A. Sutton, D.S.O., ordered abroad. He was appointed subject to his consent.

(11) *Schools.*—It was noted that Girl M. E. W. has been admitted as a paying boarder at the Royal Soldiers' Daughters' Home, at £19 per annum, which was approved.

(12) It was noted that a grant of £5 17s. has been received from the officers of the Belfast District for the General Relief Fund.

F. W. H. Davie Harris,
Lieutenant-Colonel, Secretary.

ROYAL ARMY MEDICAL CORPS FUND.

Proceedings of a Meeting of the Sub-Committee of the above to decide what Old Correspondence may be Destroyed; held at St. George's Barracks, on November 16, 1909.

Present.—Major Spencer, Major Birrell, and the Secretary.

After examining the correspondence and documents the Sub-Committee decided:—

(1) That all proceedings of meetings and ledgers of accounts should be preserved.

(2) That receipts should be kept for a period of seven years.

(3) That correspondence should be kept for three years.

(4) That the permanent records of applicants, for grants from either fund, should be preserved.

(5) That all the other papers may be destroyed.

(Signed) Ch. Spencer, *Major, R.A.M.C.*
E. T. F. Birrell, *Major, R.A.M.C.*
F. W. H. Davie Harris (*Secretary*).

St. George's Barracks, London,
November 16, 1909.

ROYAL ARMY MEDICAL CORPS BAND FUND.

Balance Sheet for the Quarter ending December 31, 1909.

Receipts.	£	s.	d.	Expenditure.	£	s.	d.
Balance Credit..	7	3	2	Bandmaster's Salary ..	30	0	0
Fares and Gratuities last quarter	3	1	0	Band Pay	34	17	2
Officers' Subscriptions, Aldershot	20	5	0	Fares to London	3	3	9
Quarterly Grant	65	0	0	Fares to be Recovered	6	4	8
One Officers' Subscription	0	5	0	Gratuities to be Recovered	6	3	0
Balance, Debtor	11	13	4	Postage ..	0	5	11
				Hawkes and Son	13	5	1
				Boosey and Son	3	6	5
				Gale and Polden	2	8	6
				Master Tailor ..	5	9	7
				Stationery	0	9	9
				Small Repairs ..	0	8	6
				Cheque Book ..	0	4	2
				Damaroll and Aldridge	1	1	0
	£107	7	6		£107	7	6

	£	s.	d.
Estimated Expenditure for Current Quarter	£108	5	4
,, Receipts ,, ,, ,,	27	7	8
Grant required ..	£80	17	8

ROYAL ARMY MEDICAL CORPS FUND.

ACCOUNTS FOR THE HALF-YEAR ENDING DECEMBER 31, 1909.

Receipts.		£ s. d.
Balance in hand, June 30, 1909—		
Current Account	£915 16 0	
Deposit Account	900 0 0	
		1,815 16 0
Subscriptions		31 1 0
Interest on Deposits		11 11 0
		£1,858 8 0

Expenditure.		£ s. d.
Grants to Band		120 0 0
Removal of Statue of Sir J. McGrigor		150 10 3
Copy of Sir John Pringle's Portrait		31 10 0
,, Sir Andrew Smith's Portrait		52 10 0
Restoring Portrait, by Wylkie		10 10 0
An Engraving, "Remnant of an Army"		2 8 0
For Framing Pictures		17 4 10
Working Expenses—		
Bankers' Charges		0 8 4
Secretary's Salary		18 15 0
Clerical Assistance		13 0 0
Postage		0 18 4
Stationery		0 16 8
Printing		0 18 9
Balance:—		
Current Account	£438 17 10	
Deposit ,,	1,000 0 0	
		1,438 17 10
		£1,858 8 0

GENERAL RELIEF FUND.

Receipts.

		£ s. d.
Balance in hand, June 30, 1909		500 16 3
By Grants—		
From Companies		120 12 8
,, Subscriptions		2 2 0
,, Dividends—		
Canadian Stock	£9 19 9	
E. Indian Railways	8 4 1	
		18 3 10
,, Rebate of Income Tax		1 9 1
,, Interest on Deposit Account		1 12 0
,, Refund		0 10 0
		£645 5 10

Expenditure.

		£ s. d.
Grants to London District		23 4 0
,, ,, Aldershot		17 0 0
,, ,, Portsmouth		22 0 0
,, ,, Dublin		10 0 0
,, ,, Chatham		4 0 0
,, ,, Edinburgh		2 0 0
,, ,, Colchester		5 0 0
,, ,, Netley		4 0 0
,, ,, Chester		4 0 0
,, ,, Woolwch		4 0 0
,, ,, Belfast		3 0 0
,, ,, Devonport		1 10 0
,, ,, Dover		4 0 0
,, ,, Jamaica		5 0 0
Bankers' Charges		0 3 10
Refund Subscription		2 2 0
Balance:—		
Current Account	£334 6 0	
Deposit ,,	200 0 0	
		534 6 0
		£645 5 10

COMPASSIONATE SCHOOL FUND.

Receipts.		£ s. d.
Balance in hand, June 30, 1909—		
Current Account	£22 7 11	
Deposit ,, ...	900 0 0	
		922 7 11
Interest on Deposit Account		10 1 7
		£932 9 6

Expenditure.		£ s. d.
Royal Soldiers' Daughters' Home..		57 0 0
St. Vincent de Paul's Orphanage		8 10 0
Gordon Boys' Orphanage		8 0 0
Home for Catholic Children		12 0 0
Balance:—		
Current Account	£46 19 6	
Deposit ,, ...	800 0 0	
		846 19 6
		£932 9 6

BALANCE SHEET.

Assets.		£ s. d.
Balance, June 30, 1909	£1,439 0 2	
Receipts by Pass Book	331 8 5	
		1,770 8 7
Less Expenditure by Pass Book		941 5 3
Balance in Bank, December 31, 1909		829 3 4
By Deposits—		
R.A.M.C. Fund		1,000 0 0
General Relief Fund		200 0 0
School Fund		800 0 0
		£2,829 3 4

Liabilities.	£ s. d.
To R.A.M.C. Fund..	1,438 17 10
,, General Relief Fund	534 6 0
,, School Fund	846 19 6
,, Outstanding Cheques	9 0 0
	£2,829 3 4

St. George's Barracks,
January 4, 1910.

Examined and found correct.

Signed { E. M. WILSON, *Lieutenant-Colonel, R.P.*
{ A. A. SUTTON, *Lieutenant-Colonel, R.A.M.C.*

ROYAL ARMY MEDICAL CORPS FUND.

Recipients of General Relief for the Quarter ending December 31, 1909.

Name	Age	District	Grant	Total	Remarks
H. I.	39	London ..	14s.	14s.	Destitute and out of work.
F. E. H. ..	44	,, ..	£3 10s.	£3 10s.	,, ,, ,,
Mrs. M. A. G. ..	66	Portsmouth	£4	£8	Suffers from rheumatism. Too old to work.
W. C. D. ..	39	Aldershot..	£3	£5	Destitute and out of work.
Mrs. S. McC. ..	34	Dublin ..	£4	£8	Three young children to support.
J. McE. ..	54	,, ..	£3	£6	To purchase clothes before being employed.
Mrs. E. A. ..	40	Netley ..	£4	£22	Four young children to support.
J. C.	45	London ..	£2 10s.	£2 10s.	Destitute and out of work.
E. G.	33	Aldershot..	5s.	5s.	,, ,, ,,
Mrs. E. M. W.	39	,, ..	£1 10s.	£1 10s.	To assist until she gets employment.
T. G. A. ..	57	London ..	£1	£1	Destitute and out of work.
Mrs. L. H. ..	58	Portsmouth	£2	£5	Out of work.
W. H. C. ..	56	London ..	£1	£3 14s.	Destitute and out of work.
Mrs. M. A. B. ..	38	Chester ..	£4	£4	Out of work. Two young children.
W. F. N. ..	47	Woolwich	£4	£8	Inability to work owing to ill-health.
Mrs. M. A. W...	36	Aldershot..	5s.	£12 5s.	Destitute and out of work.
F. W.	31	London ..	10s.	10s.	,, ,, ,,
Mrs. A. L. ..	50	Belfast ..	£3	£6	Cannot work much from ill-health.
H. S. L. ..	26	Devonport	£1 10s.	£1 10s.	Destitute and out of work.
G. R. G. ..	39	Aldershot..	£4	£10	Blind and unable to work.
Mrs. E. H. ..	53	Portsmouth	£4	£4	Destitute. Husband recently deceased.
Mrs. G. H. ..	39	Colchester	£1	£5	Temporary assistance.
Mrs. F. S. ..	37	Portsmouth	£4	£8	Has five children to support.
Mrs. E. M. J. ..	35	Dover ..	£4	£4	Destitution.

Grants from Companies to the General Relief Fund for 1909.

No.	1 and Depôt	Companies	Aldershot	£100	0	0
,,	2	Company	,,	5	0	0
,,	4, 5, 21	Companies	Netley	5	0	0
,,	6	Company	Portsmouth	5	0	0
,,	7	,,	Devonport	3	0	0
,,	8	,,	York	4	15	0
,,	9	,,	Colchester	1	0	0
,,	10	,,	Chatham	6	0	0
,,	11	,,	Dover	4	9	2
,,	12, 34	Companies	Woolwich	5	0	0
,,	13	Company	Edinburgh	7	12	9
,,	14	,,	Dublin	7	10	0
,,	15	,,	Belfast	7	0	0
,,	16	,,	Cork	5	0	0
,,	17	,,	Curragh	5	0	0
,,	18	,,	London	5	0	0
,,	19	,,	Chester	4	8	0
,,	20	,,	Tidworth		*Nil*	
,,	22	,,	Cape Town	5	0	0
,,	23	,,	Pretoria	20	0	0
,,	24	,,	Bloemfontein	20	0	0
,,	25	,,	Bermuda	5	2	0

No. 26	Company	Ceylon	£5 0 0
,, 27	,,	Hong Kong	3 9 9
,, 28	,,	Gibraltar	3 0 0
,, 29	,,	Jamaica	2 0 0
,, 30	,,	Malta	11 0 0
,, 31	,,	Mauritius	3 0 0
,, 32	,,	Singapore	*Nil*
,, 33	,,	Cairo	5 0 0
Detachments		Potchefstroom	10 0 0
,,		Middleburg	34 8 0
,,		Harrismith	5 0 0
A.T.A.		Aldershot	5 5 0
Curragh Field Ambulance			5 5 0
Sale of effects, South Africa			46 0 0
			£368 4 8

THE BENEVOLENT SOCIETY.

PROCEEDINGS OF A COMMITTEE MEETING, HELD AT THE WAR OFFICE, AT 3.30 P.M., ON JANUARY 18, 1910, IN ROOM 217.

Present.

Colonel J. Lane Notter, Vice-President, in the chair.
Colonel D. Wardrop, C.V.O.
Colonel A. Peterkin.
Lieutenant-Colonel E. M. Wilson, C.B., C.M.G., D.S.O.
Major C. G. Spencer.
Major E. T. F. Birrell.

(1) The Minutes of the last meeting were read and confirmed.

(2) A letter was read from Mrs. K. G., asking for a supplementary grant, for her brother, the orphan of the late Brigade-Surgeon M. Q., on the ground, that as the orphan had reached the age of 18, his compassionate allowance from the War Office ceased, and the orphan had now started learning engineering, so his expenses were unusually heavy, and he would not receive sufficient salary, for some years, to maintain himself. Resolved that a grant of £16 be given.

(3) An application was read from the widow of the late Surgeon-Major E. C. R. W., A.M.S., asking for a grant for two orphan daughters under the age of 21. It was resolved that a grant of £15 be given.

(4) It was noted that a legacy of £100, free of legacy duty, has been bequeathed to the Society, by the late Surgeon-General Mouat, V.C., on the death of Lady Mouat.

(5) The Annual Accounts for 1909 having been duly audited, were considered and adopted and are appended to these Minutes.

(6) The following report of the Sub-Committee appointed in Minute 6 of the Committee Meeting held on July 15 last, to decide what old correspondence may be destroyed, was adopted: "Proceedings of a Meeting of the Sub-Committee to decide what old correspondence may be destroyed, held at St. George's Barracks on November 16, 1909. *Present:* Major Spencer, Major Birrell, The Secretary. After examining the correspondence and the documents, the Sub-Committee decided:—

(1) That all proceedings of meetings and ledgers of accounts should be preserved.
(2) That receipts should be kept for a period of seven years.
(3) That correspondence should be kept for three years.
(4) That the permanent records of applicants for grants should be preserved.
(5) That all other papers may be destroyed."

(7) The Committee adopted the following Report for the year 1909:—
The number of subscribers for the year was 175.

	£	s.	d.
The receipts for the year amounted to	938	19	4
And the expenditure	978	18	6

Grants were made to 25 applicants, representing 37 orphans.

ARMY MEDICAL OFFICERS' BENEVOLENT SOCIETY.

Statement of Accounts for the Year 1909.

Receipts.	£	s.	d.
To Balance in hand, January 1, 1909	420	17	0
,, Subscriptions	193	11	0
,, One Year's Dividend, 3 % Debenture Stock L. & N.W. Railway (*less* tax £10 8s. 4d.)	189	11	10
,, One Year's Dividend, 3 % Debenture Stock N.E. Railway (*less* tax £10 8s. 4d.)	189	11	4
,, One Year's Dividend, 2½ % Debenture Stock Midland Railway (*less* tax £8 6s. 8d.)	151	13	4
,, One Year's Dividend, 4 % Debenture Stock Caledonian Railway (*less* tax £6 2s. 6d.)	105	1	6
,, Dividends on £762 7s. 6d. Consols	10	4	11
,, Rebate on Income Tax	34	2	6
,, Legacy from Colonel J. Wilson	5	0	0
,, Officers' Mess, Middleburg, Donation	14	2	11
	£1,319	16	4

Expenditure.	£	s.	d.
By Donations given by—			
Annual General Meeting	515	0	0
Committee	125	0	0
Secretary	11	0	0
,, Secretary's Salary, September 30, 1908, to September 30, 1909	37	10	0
,, Clerical Assistance	26	0	0
,, Bankers' Charges	0	0	3
,, Auditor	1	1	0
,, Printing	7	12	9
,, Postage	2	0	10
,, Stationery	2	7	8
,, Purchase of £300 Consols at $83\frac{5}{8}$	250	17	6
,, Stamps and Commission on above	0	8	6
,, Balance in Bank	340	17	10
	£1,319	16	4

Investments.	£	s.	d.
L. & N.W. Railway 3 % Debenture Stock	6,667	0	0
Midland ,, 2½ % ,, ,,	6,400	0	0
N. Eastern ,, 3 % ,, ,,	6,666	0	0
Caledonian ,, 4 % ,, ,,	2,780	0	0
Consols, 2½ %	762	7	6
	£23,275	7	6

We have compared the above statement with the books and papers relating thereto, and certify that it is correct. We have verified the Bank balance and the Investment in Consols, and have inspected the Certificates of the Investments as in Railway Stocks as set out.

January 7, 1910.

(*Signed*) EVANS, PIERSON & CO.

A legacy of £5 was received from the executors of the late Colonel J. Wilson.
A donation of £14 2s. 11d. was received from the Officers, Middelburg, C.C.
£300 Consols at 83¾ were purchased at an expenditure of £251 6s.
The value of the Society's investments on December 31, 1909, were as follows :—

£	s.	d.					£	s.	d.
6,400	0	0	Midland Railway	2½ %	Debenture Stock at	71	4,544	0	0
6,667	0	0	L. & N.W. ,,	3	,, ,,	88	5,866	19	0
6,666	0	0	N.E. ,,	3	,, ,,	85	5,666	2	0
2,780	0	0	Caledonian ,,	4	,, ,,	112	3,113	12	0
762	7	6	Consols				632	15	5
£23,275	7	6					£19,823	8	5

F. W. H. Davie Harris, *Lieutenant-Colonel,*
Secretary.

ROYAL ARMY MEDICAL CORPS, WARRANT OFFICERS' AND SERJEANTS' (PAST AND PRESENT) ANNUAL DINNER CLUB.

Since the announcement in July, 1909, p. 29, vol. xiii. of the Corps News, Lieutenant-Colonel C. E. Nichol, D.S.O., M.B., a Vice-President of the Club, has vacated the command of the Depôt at Aldershot, and Lieutenant-Colonel G. D. Hunter, D.S.O., who succeeds him, has very kindly honoured the Club by becoming one of its Vice-Presidents.

The time for the second annual dinner is fast approaching and the Committee will meet early in February with a view to working out details.

Warrant Officers and Serjeants desirous of joining the Club should communicate with the Honorary Secretary, Staff-Serjeant E. J. Harris, R.A.M.C., The Old Palace, Maidstone.

The undermentioned have joined the Club since the publication of the lists of names referred to in the May, 1909, and July, 1909, numbers of the Corps News: Serjeant W. Tindall, Serjeant-Major R. Downing, Quartermaster-Serjeant F. C. Cross, Serjeant R. Sproule, Staff-Serjeant B. Holmes, Serjeant E. R. Loft, Mr. J. J. Saunders, Serjeant A. E. Harrold, Mr. G. F. Lander, Serjeant-Major W. E. Eato, Serjeant T. Gregson, Serjeant A. E. Barrett, Staff-Serjeant H. Williams, Staff-Serjeant Cardwell, Serjeant V. E. Jewell, Serjeant H. L. Thompson, Staff-Serjeant E. Kerstein, Mr. H. E. Hallowell, Mr. G. C. Beater.

BIRTHS.

BURKE.—At Devonport, on November 27, 1909, the wife of Captain B. B. Burke, R.A.M.C., of a daughter.

HARRISON.—On January 16, at 76, Prince of Wales Mansions, Battersea Park, S.W., the wife of Captain L. W. Harrison, R.A.M.C., of a son.

BELL.—At Liverpool, on January 22, 1910, the wife of Captain J. G. Bell, of a son.

MARRIAGE.

FARQUHARSON—LLOYD.—On November 15, 1909, at St. James's Church, Delhi, by the Rev. J. W. Maunsell, Military Chaplain, Christopher William Farquharson, 31st Lancers, son of Colonel Farquharson, R.M.L.I., to Florence Marie Moore, only daughter of Surgeon-General O. P. Lloyd, V.C., granddaughter of the late Captain and Lady Louisa Morgan, and grand-niece of the late Earl of Mountcashell.

DEATHS.

WEIR.—At Lucknow, on December 20, 1909, Major James Christopher Weir, M.B. He entered the Service on February 5, 1887, and was promoted Major on February 5, 1907.

HALE.—At Faddeley, Cheshire, on December 25, 1909, Surgeon-Major Thomas Egerton Hale, V.C., C.B., B.A., M.D., Half-pay, Army Medical Department, aged 77. He entered the Service on December 14, 1854; served in the 7th Foot, 43rd Foot, and on the Staff; became Surgeon October 4, 1867, and Surgeon-Major March 1, 1873. His war service was: Crimean Campaign, 1855; Siege of Sevastapol. Medal with clasp; Turkish medal; V.C.

DOUGLAS.—At Berdwood, Horrington, Wells, on December 31, 1909, Honorary Brigade-Surgeon Campbell Millis Douglas, V.C., M.D., late Army Medical Department, aged 69. He entered the Service on October 1, 1862; served on the Staff in the 24th Foot and Royal Artillery; became Surgeon, A.M.D., on March 1, 1873; Surgeon-Major April 28, 1876; and Surgeon-Lieutenant-Colonel October 1, 1882, on which date he retired with the honorary rank of Brigade-Surgeon. His war service was the Expedition to the Little Andaman Islands, 1867, for which he received the Victoria Cross for gallant conduct in assisting in the rescue of seventeen officers and men.

EXCHANGES, &c.

In the event of Reprints or "Excerpts" of articles being required by the authors, notification of such must be sent when submitting the papers. Reprints and Excerpts may be obtained at the following rates, and additional copies at proportionate rates:—

Number of Reprints	Number of Pages	Cost of Reprints	Cost of EXCERPTS *	Extra for Covers for Reprints: As Journal, Printed on Front	As Journal, Plain, Unprinted	Cheaper Paper, Printed on Front	Cheaper Paper, Plain, Unprinted
		£ s. d.	£ s. d.	s. d.	s. d.	s. d.	s. d.
12	4	0 2 6	0 1 0	3 6	0 11	3 2	0 7
	8	0 4 6	0 2 0				
	16	0 7 6	0 3 6				
25	4	0 3 0	0 1 3	4 0	1 3	3 6	0 9
	8	0 5 6	0 2 6				
	16	0 9 6	0 4 6				
50	4	0 4 0	0 1 8	5 0	1 9	4 0	1 0
	8	0 6 9	0 3 2				
	16	0 12 0	0 5 3				
100	4	0 5 6	0 2 9	6 6	3 3	5 6	2 0
	8	0 9 0	0 4 4				
	16	0 16 9	0 6 9				
200	4	0 8 6	0 4 0	9 0	6 3	7 6	4 0
	8	0 13 6	0 6 0				
	16	1 3 6	0 8 9				

* These are not arranged as Reprints, but appear precisely as in the Journal with any other matter that in the Journal may happen to appear on the first and last pages of the particular excerpt ordered.

Cases for Binding Volumes.—Strong and useful cases for binding can be obtained from the publishers at the undermentioned rates:—

Covers, 1s. 4d. net; binding, 1s. 2d.
These charges are exclusive of cost of postage.

In forwarding parts for binding the name and address of sender should be enclosed in parcel.

Notices.

EDITORIAL NOTICES

The Editor will be glad to receive original communications upon professional subjects, travel, and personal experiences, &c. He will also be glad to receive items of news and information regarding matters of interest to the Corps from the various garrisons, districts, and commands at home and abroad.

All such Communications or Articles accepted and published in the "Journal of the Royal Army Medical Corps" will (unless the Author notified at the time of submission that he reserves the copyright of the Article to himself) become the property of the Library and Journal Committee, who will exercise full copyright powers concerning such Articles.

Matter intended for the Corps News should reach the Editor not later than the 15th of each month for the following month's issue. Notices of Births, Marriages, and Deaths are inserted free of charge to subscribers and members of the Corps. All these communications should be written upon one side of the paper only; they should by preference be type-written, but, if not, all proper names should be written in capital letters (or printed) to avoid mistakes, and be addressed The Editor, "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS," War Office, Whitehall, London, S.W.

Communications have been received from Brevet-Colonel F. J. Lambkin, Colonel Count Gleichen, Major W. T. Mould, Major A. P. Blenkinsop, Captain J. Dorgan, Major H. W. Grattan, Captain S. G. Butler, Major C. E. Pollock, Lieutenant-Colonel B. L. Mills, Captain H. T. Wilson, Lieutenant V. T. Carruthers, Lieutenant-Colonel J. B. Wilson, Major W. D. Sutherland, I.M.S., Captain H. E. Gotelee, Captain J. Cowan.

The following publications have been received:—

British: Guy's Hospital Gazette, The Hospital, The Medical Press and Circular, Army and Navy Gazette, The St. Thomas's Hospital Gazette, The Australasian Medical Gazette, The Indian Medical Gazette, The Journal of Tropical Medicine and Hygiene, Practical Medicine, The Lancet, Proceedings of the Royal Society of Medicine, Fifth Annual Report of the Henry Phipps Institute, Journal of the Royal Sanitary Institute, The Royal Engineers' Journal, The Practitioner, Public Health, Annual Report of the Education Committee (City of Sheffield), The Medical Review, Journal of the Royal Institute of Public Health, The Shield, Sleeping Sickness Bureau, The Cavalry Journal, Journal of the Royal United Service Institution, The British Journal of Tuberculosis.

Foreign: Archiv für Schiffs-und Tropen-Hygiene, Tidscrift I Militär Hälsovard, Deutsche Militarztliche Zeitschrift, Archivos de Hygiene e Pathologia Exoticas, Norsk Tidsskrift for Militaermedicin, Archives de Médecine Navale, Archives de Médecine et de Pharmacie Militaires, Annales d'Hygiene et de Médecine Coloniales, The Military Surgeon, Bulletin of the Johns Hopkins Hospital, Revista de Sanidad Militar y La Medicina Militar Española, Boletin de Sanidad Militar, Statistica Sanitaria dell' Armata, Japanese Journal, United States Department of Agriculture, United States Naval Medical Bulletin.

MANAGER'S NOTICES.

The JOURNAL OF THE ROYAL ARMY MEDICAL CORPS is published monthly, six months constituting one volume, a volume commencing on 1st July and 1st January of each year.

The Annual Subscription is £1 (which includes postage), and should commence either on 1st July or 1st January; but if a subscriber wishes to commence at any other month he may do so by paying for the odd months between 1st July and 1st January at the rate of 1s. 8d. (one shilling and eightpence) per copy. (All subscriptions are payable in advance.)

Single copies can be obtained at the rate of 2s. per copy.

The Corps News is also issued separately from the Journal, and can be subscribed for at the rate of 2s. (two shillings) per annum, including postage. Subscriptions should commence from 1st July each year; but if intending subscribers wish to commence from any other month, they may do so by paying for the odd months at the rate of 2d. per copy. (All subscriptions are payable in advance.)

Officers of the Royal Army Medical Corps possessing Diplomas in Public Health, &c., are kindly requested to register their special qualifications at Headquarters. Letters of complaint are frequently received from officers stating that their special qualifications have not been shown in the Distribution List which is published as a supplement to the Journal in January and July of each year. As, however, the particulars of this list are supplied from official sources, officers are reminded that unless the possession of Diplomas, &c., has been registered at Headquarters, no entry of such qualifications can be recorded in the Distribution List.

Letters regarding non-delivery of the Journal, or change of address, should be sent to the Hon. Manager, "Journal of the Royal Army Medical Corps," War Office, Whitehall, London, S.W., and reach there not later than the 20th of each month.

It is requested that all Cheques or Postal Orders for Subscriptions to the Journal, Corps News, Reprints, &c., be crossed "Holt & Co.," and made payable to the "Hon. Manager, Journal R.A.M.C.," and not to any individual personally.

All communications for the Hon. Manager regarding subscriptions, &c., should be addressed to

THE HON. MANAGER,
"JOURNAL OF THE ROYAL ARMY MEDICAL CORPS,"
WAR OFFICE, WHITEHALL, S.W.

JOURNAL

OF THE

ROYAL ARMY MEDICAL CORPS.

Corps News.

March, 1910.

ARMY MEDICAL SERVICE.

Major Charles E. Pollock, Royal Army Medical Corps, to be a Deputy-Assistant-Director-General (attached to the Department of the Director of Military Operations), *vice* Lieutenant-Colonel W. G. Macpherson, C.M.G., M.B., Royal Army Medical Corps, whose tenure of that appointment has expired, dated December 29, 1909.

Surgeon-General Francis W. Trevor, C.B., M.B., Principal Medical Officer in India, to be an Honorary Surgeon to the King, *vice* Surgeon-Major-General C. D. Madden, C.B., deceased, dated January 6, 1910.

ROYAL ARMY MEDICAL CORPS.

Major Frederick Kiddle, M.B., is seconded whilst holding the appointment of Deputy-Surgeon at the Royal Hospital, Chelsea, dated January 1, 1910.

The undermentioned officers are seconded: Captain John Powell, M.B., for service with the Egyptian Army, dated September 22, 1909; Lieutenant Stephen Field, for service under the Colonial Office, dated October 1, 1909.

Lieutenant W. P. McArthur, from the Seconded List, is restored to the Establishment, dated December 1, 1909.

The undermentioned Lieutenants from the Seconded List, are restored to the Establishment, dated January 11, 1910; Lionel C. Hayes, M.B.; Bernard G. Goodwin; Eustace M. Parsons-Smith, dated January 30, 1910; William H. O. Riordan, dated January 31, 1910.

The undermentioned Captains to be Majors, dated January 28, 1910: Edgar T. Inkson, V.C.; Percy H. Collingwood; Charles J. O'Gorman, D.S.O.; Robert S. H. Fuhr, D.S.O.; Harold P. W. Barrow; David Harvey, M.B.

The undermentioned Lieutenants are confirmed in that rank; Gilbert G. Collet, M.B.; Francis W. M. Cunningham, M.B.; Harry R. Edwards; Rupert H. Nolan; William Mathieson; Gilbert H. Dive; Robert Gale, M.B.; Alfred G. Jones, M.B.; Kenneth Comyn; Arthur S. Cane; John M. Weddell; Charles M. Nicol, M.B.; Arthur P. O'Connor, M.B.; Thomas H. Dickson, M.B.; Hugh G. Robertson, M.B.; Herbert V. Stanley, M.B.; Philip C. Field; Ronald M. Davies, M.B.; Richard C. G. M. Kinkead, M.B.; Edward C. Stoney, M.B.

Major Robert Thacker retires on retired pay, dated January 26, 1910. He entered the service on February 5, 1887; became Major on February 5, 1899, and retired on retired pay on January 26, 1910.

His war service is: North-West Frontier of India, 1897-1898; operations on the Samana, and at the Ublan Pass, with Tirah Expeditionary Force. Medal with two clasps. South African War, 1899-1902; operations in Orange River Colony (June, 1900); operations in Cape Colony, South of Orange River, 1899-1900; operations in Cape Colony and Orange River Colony, November 30, 1900, to May 31, 1902. Queen's Medal with two clasps. King's Medal with two clasps.

Captain John G. Berne, retires, receiving a gratuity, and not as stated in the *Gazette* of February 1, 1910. He entered the service on January 28, 1898, became Captain on January 28, 1901, and retired receiving a gratuity on February 2, 1910.

His war service is: Operations in Sierra Leone, 1898-99. Medal with clasp.

South African War, 1899-1902. Operations in the Orange River Colony, February to May, 1900, including action at Dreifontein (slightly wounded). Despatches *London Gazette*, February 8, and August 20, 1901. Queen's Medal with six clasps. King's Medal with two clasps.

Lieutenant-Colonel John R. Yourdi, M.B., is placed on retired pay, dated February 6, 1910. He entered the service on July 30, 1881; became Surgeon-Major July 30, 1893: Lieutenant-Colonel July 30, 1901, and retired on retired pay on February 6, 1910.

His war service is: Egyptian Expedition, 1882. Medal; bronze star.

Quartermaster and Honorary Lieutenant William Duncan is placed on retired pay, dated January 26, 1910.

Serjeant-Major Charles William Kinsella to be Quartermaster with the honorary rank of Lieutenant, *vice* W. Duncan, dated January 26, 1910.

The undermentioned Quartermasters and Honorary Lieutenants are granted the honorary rank of Captain: Joseph Attwood and William Duncan (late Royal Army Medical Corps), dated January 24, 1910; Forbes Bruce, Henry J. F. Audus, Walter G. Holway (late Royal Army Medical Corps), Edward P. Offord, dated February 3, 1910.

Quartermaster and Honorary Captain Forbes Bruce retires on retired pay, dated February 5, 1910.

Quartermaster and Honorary Lietenant Walter G. Holway is placed on retired pay on account of ill-health, dated February 3, 1910.

INCREASED PAY.—The undermentioned Lieutenant-Colonels have been selected for increased pay under Article 317 of the Royal Warrant from the dates specified: F. S. Heuston, C.M.G., January 2, 1910, and G. F. Gubbin, January 14, 1910.

The undermentioned Majors have been granted the higher rate of pay under the provisions of Article 317, Pay Warrant, from February 1, 1910: Majors S. G. Moores, T. B. Beach, C. W. R. Healey, J. H. E. Austin, W. T. Mould, A. W. Bewley, C. A. Stone, and L. Way.

ARRIVALS HOME FOR DUTY.—From South Africa: Surgeon-General W. W. Kenny; Majors D. J. Collins and J. M. Buist; Captains P. J. Hanafin, E. M. Glanvill, and E. C. Whitehead. From Bermuda: Major A. H. O. Young: Captain A. M. Rose. From Somaliland: Lieutenants S. Field and F. Worthington. From India: Lieutenant-Colonels F. P. Nichols, G. Wilson, H. A. Haines, H. D. Rowan, and D. M. O'Callaghan; Majors B. J. Inniss, and K. M. Cameron; Captains S. M. W. Meadows, H. C. Hildreth, A. C. Osburn, A. L. Otway, and M. D. Ahern.

ARRIVALS AT HOME ON SICK LEAVE.—Lieutenant J. H. Gurley from Egypt.

TRANSFERRED TO HOME ESTABLISHMENT. — Major M. M. Rattray and Captain F. M. M. Ommanney.

TRANSFERS.—Lieutenant-Colonel T. du B. Whaite from the Eastern Command to Royal Arsenal, Woolwich, March 15, 1910. Major J. D. Ferguson, D.S.O., Aldershot to London District, March 1, 1910. Major A. E. Master, Eastern Command to Royal Arsenal, Woolwich, April 1, 1910.

POSTINGS. — To Northern Command: Surgeon-General W. W. Kenny, Major A. H. O. Young, Lieutenant H. G. Robertson. To Aldershot Command: Lieutenant-Colonels H. D. Rowan and D. M. O'Callaghan, Captain A. M. Rose, Lieutenants G. G. Collet and P. C. Field. To Eastern Command: Lieutenant-Colonel G. Wilson, Major B. J. Inniss, Captain S. M. W. Meadows, Lieutenants S. Field, H. R. Edwards, K. Comyn, C. M. Nicol, E. C. Stoney, A. P. O'Connor, R. M. Davies, and W. Mathieson. To Southern Command: Major J. M. Buist, Captains D. S. Skelton, E. M. Glanvill and P. J. Hanafin, Lieutenants A. G. Jones, V. P. Hutchinson, and T. W. Stallybrass. To London District: Lieutenants G. H. Dive, A. S. Cane, J. M. Weddell, and R. Gale. To Irish Command: Major D. J. Collins, Captains M. D. Ahern, E. C. Whitehead, H. C. Hildreth, and A. L. Otway, Lieutenants F. W. M. Cunningham, T. H. Dickson, R. C. G. M. Kinkead, and H. V. Stanley. To Jersey: Lieutenant-Colonel F. P. Nichols.

APPOINTMENTS.—Lieutenant-Colonel T. du B. Whaite, Senior Medical Officer Royal Arsenal, Woolwich; Major J. D. Ferguson, D.S.O., Recruiting Medical Officer London District; Major D. J. Collins, Specialist in Ophthalmology, Dublin; Major A. E. Master, Medical Officer, Royal Arsenal, Woolwich.

Brevet-Lieutenant-Colonel Sir W. B. Leishman has been re-appointed Professor of Pathology in the Royal Army Medical College, with effect from February 1, 1910.

The appointment of Lieutenant-Colonel R. J. Windle as Physician and Surgeon at the Royal Hospital, Kilmainham, has been extended for a period of two years.

EMBARKATIONS.—For South Africa: Major A. J. Chambers, Captains N. J. C. Rutherford, H. B. Fawcus, G. Carroll, and O. W. A. Elsner. For Bermuda: Major E. W. W. Cochrane. For India: Lieutenant-Colonels G. G. Adams, H. Carr, H. E. Cree, and G. F. H. Marks, Major C. T. Samman, Captain H. C. R. Hime, Lieutenants G. Petit, F. J. Stuart, J. B. Hanafin, H. Gibson, C. A. T. Conyngham, B. Varvill, A. Shepherd, W. J. Dunn, F. B. Dalgleish, S. G. Walker, F. M. Hewson, A. L. Foster, C. M. Rigby, T. S. Eves, L. Murphy, J. S. McCombe, W. J. Tobin, R. O'Kelly, C. Ryles.

His Majesty has been pleased to approve of a Good Service Reward of £50 per annum being granted to each of the undermentioned officers: Colonel J. F. Supple, C.B.; Colonel J. F. Williamson, C.B., C.M.G.

RESULTS OF EXAMINATION OF MAJORS AND LIEUTENANTS, ROYAL ARMY MEDICAL CORPS.

The following results of examinations are notified for general information:—

Passed in Military Law for the rank of Lieutenant-Colonel: Majors E. C. Anderson, D.S.O.; A. G. Thompson, M.B.; Captain J. Fairbairn, M.B.

Passed in technical subjects for the rank of Lieutenant-Colonel: Majors T. H. J. C. Goodwin, D.S.O.;

Passed in A. M. O: N. Faichnie. M.B.

(*h*) *i*.—D. Coutts, M.B.; G. P. A. Bracken.

Passed in (*b*) for the rank of Captain: H. Gibson; L. Murphy; F. B. Dalgleish; S. G. Walker, M.B.; E. J. Kavanagh, M.B.; A. M. Bennett.

Passed in (*h*) *ii* and *iii* for the rank of Captain: O. C. P. Cooke; C. W. Bowle; E. J. Kavanagh, M.B.; A. H. Jacob; J. L. Wood; F. T. Turner; O. R. McEwen; C. F. Rudkin; W. B. Purdon, M.B.; A. G. Wells.

Passed in (*d*) *ii* for the rank of Captain: C. W. Bowle; E. J. Kavanagh, M.B.; A. H. Jacob; J. L. Wood; F. T. Turner; O. R. McEwen; C. F. Rudkin; W. B. Purdon, M.B.; H. W. Farebrother; A. G. Wells.

(*h*) *ii*.—T. T. H. Robinson, M.B.; J. E. M. Boyd; F. Casement, M.B.

(*h*) *iii*.—E. B. Lathbury; E. D. Caddell, M.B.; W. W. Boyce; J. du P. Langrishe, M.B.

Passed in Military Law for the rank of Lieutenant-Colonel: Majors L. A. Mitchell, M.B. (91·5 per cent.); G. Dansey-Browning (87·5 per cent.); K. B. Barnett, M.B., F.R.C.S.I. (87·5 per cent.). Captains G. H. Goddard (75 per cent.); G. G. Delap, D.S.O.; A. A. Seeds, M.D. (75 per cent.); E. B. Knox, M.D.; H. S. Roch (75 per cent.); C. R. Evans (75 per cent.); E. P. Sewell, M.B. (75 per cent.); FitzG. G. Fitzgerald (75 per cent.); J. T. Johnson, M.D. (75 per cent.); P. G. Hyde, M.B. (75 per cent.).

Passed in technical subjects for the rank of Lieutenant-Colonel: Majors N. Tyacke; T. P. Jones, M.B.; C. T. Samman; G. Dansey-Browning (85·5 per cent. Med. Hist.); K. B. Barnett, M.B., F.R.C.S.I.

Passed in A.M.O.: L. A. Mitchell, M.B.; R. C. Lewis. S. and E.: L. A. Mitchell, M.B.; F. W. Hardy, M.B.; C. M. Fleury. Med. Hist.: F. W. Hardy, M.B.; G. A. Moore, M.D.

Passed in (*h*) *ii* and *iii* for the rank of Captain: H. Gibson; C. T. Conyngham, M.B.; J. C. L. Hingston; J. James, M.B.; R. M. Dickson, M.B. (80 per cent.); A. L. Stevenson, M.B.; W. J. Dunn, M.B.; M. Leckie: S. G. Walker, M.B.; F. M. Hewson; A. L. Foster; C. M. Rigby; L. Murphy.

Passed in (*d*) *ii* for the rank of Captain: F. B. Dalgleish (75 per cent.); T. S. Eves, M.B.; H. Gibson; C. T. Conyngham, M.B. (75 per cent.); J. C. L. Hingston; J. James, M.B.; R. M. Dickson, M.B.; A. L. Stevenson, M.B. (75 per cent.); J. W. Houston, M B. (75 per cent.); W. J. Dunn, M.B.; M. Leckie; S. G. Walker, M.B.; F. M. Hewson; A. L. Foster (75 per cent.); C. M. Rigby; L. Murphy.

Passed in (*h*) *ii*.—F. B. Dalgleish.

Passed in (*h*) *iii*.—T. S. Eves, M.B.; H. V. B. Byatt.

Major C. T. Samman was called to the Bar at the Middle Temple, Hilary Term, January 26, 1910.

The Special Board of Medicine, University of Cambridge, have admitted the Royal Army Medical College (Queen Alexandra Military Hospital) to the list of hospitals recognised by them for the purposes of Regulation 20, for the degree of Bachelor of Medicine (Ordinances, 1908, p. 210).

PROMOTIONS.

The following promotions, to complete establishment, will take effect from the dates specified :—

To be Serjeant-Majors.

No.	Rank and Name	Date	Section	Remarks
8821	Qmr.-Serjt. J. Jackson..	29.10.09	..	*Vice* C. E. Phillips, to pension.
10339	,, F. O. Chappell	24.11.09	..	,, W. H. Bellingham, to pension.
9984	,, F. C. Cross	13.12.09	..	,, C. A. Barton, to pension.

To be Quartermaster-Serjeants.

No.	Rank and Name	Date	Section	Remarks
10059	S.-Serjt. G. W. Carnell..	29.10.09	..	*Vice* J. Jackson, promoted.
11066	,, H. B. Lee ..	1.11.09	..	,, J. H. Curtayne, to pension.
11141	,, T. E. Coggon ..	10.11.09	..	,, G. J. Lander, to pension.
11123	,, H. J. Polhill ..	24.11.09	..	,, F. O. Chappell, promoted.
9984	Qmr.-Serjt. F. C. Cross	10.12.09	..	From Egyptian Army, *vice* T. W. Cardwell, to Territorial Forces.
10221	S.-Serjt. E. Larner ..	13.12.09	..	*Vice* F. C. Cross, promoted.

To be Staff-Serjeants.

No.	Rank and Name	Date	Section	Remarks
10721	Serjt. A. Smith.. ..	15.10.09	..	*Vice* H. J. Power, to pension.
11144	,, A. McCreeth ..	29.10.09	..	,, G. W. Carnell, promoted.
10434	,, H. J. Anderson ..	1.11.09	..	,, H. B. Lee, promoted.
12058	,, A. W. Pettley ..	5.11.09	..	,, J. M. Mason, to pension.
10024	,, G. Lampard ..	10.11.09	..	,, T. E. Coggon, promoted.
11841	,, S. R. Holmes ..	16.11.09	..	,, A. Smith, to Territorial Forces.
10580*	Lce.-Serjt. A. Gibbons..	22.11.09	..	,, J. R. Sainty, to pension.
10581	Serjt. H. Warsop ..	24.11.09	..	,, H. J. Polhill, promoted.
9903	,, R. T. Pack ..	10.12.09	..	,, T. W. Cardwell, to Territorial Forces.
11419	,, J. H. McClelland	13.12.09	..	,, E. Larner, promoted.
10675	,, W. Richardson ..	15.12.09	..	,, J. W. Cook, to pension.
9200	,, T. J. Cross ..	15.12.09	..	,, W. Richardson, Supernumerary with Colonial Government.
10953	,, W. H. Way ..	16.12.09	..	,, A. E. Ford, to pension.
8886	,, E. E. Sparrow ..	22.12.09	..	,, E. W. Simpson, to pension.
10922	,, H. Robinson ..	22.12.09	..	,, E. E. Sparrow, Supernumerary with Territorial Forces.

* Special for services rendered in connection with the Sleeping Sickness Commission in Uganda.

To be Serjeants.

No.	Rank and Name	Date	Section	Remarks
18253	Lce.-Serjt. J. Suter ..	5.10.09	General Duty	*Vice* A. D. Wattson, to pension.
18976	,, E. G. Robinson	15.10.09	Q.A.I.M.N.S.	,, A. Smith, promoted.
18337	,, C. Leaker ..	23.10.09	Nursing ..	,, J. M. Webb, to pension.
18432	,, G. F. Pearce	29.10.09	Clerical ..	,, A. McCreeth, promoted.
18445	,, J. E. Crawley	1.11.09	General Duty	,, H. J. Anderson, promoted.
18634	,, F. H. Galton	5.11.09	Nursing ..	,, A. W. Pettley, promoted.
18850	,, G. W. Eagles	10.11.09	General Duty	,, G. Lampard, promoted.
17500	Crpl. R. R. White ..	16.11.09	Nursing ..	,, S. R. Holmes, promoted.
18239	,, R. F. Roland ..	18.11.09	,, ..	,, E. Wing, to Territorial Forces.
17928	,, W. S. Toye ..	24.11.09	,, ..	,, H. Warsop, promoted.
4671*	Pte. T. Dent	25.11.09	General Duty	,, J. Nye, to pension.
18576	Crpl. W. Lamkin ..	1.12.09	,, ,,	,, W. Dawson, to Territorial Forces.
18385	Lce.-Serjt. F. W. Coupland	10.12.09	,, ,,	,, R. T. Pack, promoted.
18645	,, C. E. Rouse	13.12.09	Nursing ..	,, J. H. McClelland, promoted.
12461	Crpl. P. F. Cook ..	15.12.09	Clerical ..	,, T. J. Cross, promoted.
18018	,, F. G. Phipps ..	16.12.09	General Duty	,, W. H. Way, promoted.
19253	,, C. Wilson	20.12.09	Nursing ..	,, W. McCarthy, to Territorial Forces.
17937	,, P. A. Kirby ..	22.12.09	Cooking ..	,, H. Robinson, promoted.

* Special as Serjeant Master Taylor.

To be Corporals.

To complete establishment, 1.1.10: 13923 Lance-Corporal C. Stewart, General Duty; 16447 Lance-Corporal J. W. Ashworth, General Duty; 15969 Lance-Corporal F. C. Dean, General Duty; 17084 Lance-Corporal J. Hunter, General Duty; 17257 Lance-Corporal J. J. Bartleet, Cooking; 17244 Lance-Corporal A. F. McArthur, Clerical; 18094 Lance-Corporal W. Burns, General Duty; 19029 Lance-Corporal R. E. Harvey, Nursing; 11064 Lance-Corporal F. Slattery, Cooking; 11392 Lance-Corporal E. Conner, Nursing; 12384 Lance-Corporal T. W. Burnhill, General Duty; 12518 Lance-Corporal H. Gale, General Duty; 12618 Lance-Corporal W. A. Mayman, Nursing; 12947 Lance-Corporal M. Henderson, Clerical; 13018 Lance-Corporal G. Turner, Nursing; 13035 Lance-Corporal G. V. Chandler, Nursing; 16882 Lance-Corporal G. J. Short, Nursing; 17303 Lance-Corporal A. Auchterlonie, Nursing; 17358 Lance-Corporal C. Ennor, Cooking; 17368 Lance-Corporal J. E. Skennell, General Duty; 17385 Lance-Corporal W. Thornton, Nursing; 17390 Lance-Corporal R. Cowx, Clerical; 17413 Lance-Corporal E. Tweed, General Duty; 17464 Lance-Corporal N. J. Emery, Cooking; 17465 Lance-Corporal J. Bell, Cooking; 17450 Lance-Corporal W. J. Elsey, General Duty; 17497 Lance-Corporal F. Genge, Cooking.

APPOINTMENTS.

The following appointments, to complete establishment, will take effect, from the dates specified:—

To be Lance-Serjeants. (As Dispensers.)

To complete establishment, 1.1.10: 9121 Corporal S. Barter, General Duty; 11788 Corporal D. Macdonald, General Duty; 15725 Corporal T. Eastwood, Nursing; 9559 Corporal W. Greaves, Cooking; 16565 Corporal C. Vickers, Nursing; 8990 Corporal H. H. Field, Cooking; 18158 Corporal G. P. Pursey, Nursing; 18420 Corporal A. J. Sanderson, Nursing; 15776 Corporal H. G. Blackman, Nursing; 11117 Corporal W. Griffiths, Nursing; 11402 Corporal E. Stokes, Nursing.

To be Lance-Corporals.

No.	Rank and Name	Date	Section	Remarks
19543	Pte. F. E. H. Audus ..	2.11.09	Nursing ..	Special under para. 281, S.O.
103	,, G. P. Steer ..	2.11.09	Clerical ..	
19732	,, H. Mayes	23.11.09	Nursing ..	
19980	,, H. J. Loder ..	29.11.09	,, ..	
19618	,, P. Bettison ..	6.12.09	Clerical ..	
45	,, T. J. Moffatt ..	20.12.09	Nursing ..	
19641	,, W. M. Hardie ..	20.12.09	Clerical ..	
19070	,, H. Siddall	24.12.09	Nursing ..	
9884	,, S. M. Corbett ..	1.1.10	General Duty	To complete Establishment.
12006	,, G. Ward		,, ,,	
12245	,, C. F. Penney ..		Nursing ..	
12385	,, E. A. Rayner ..		,, ..	
12594	,, W. Wright ..		General Duty	
18374	,, A. Burke		Nursing ..	
168	,, T. J. Watkins ..		General Duty	
16762	,, F. Price		Nursing ..	
17388	,, J. C. Church ..		,, ..	
17506	,, P. Blong		General Duty	
17742	,, A. T. Platt.. ..		,, ,,	
17960	,, T. McGuire ..		,, ,,	
17997	,, D. Morgan.. ..		Cooking ..	
18128	,, J. T. Marr.. ..		Nursing ..	
18152	,, J. Oswald		,, ..	
18199	,, A. H. Staff ..		General Duty	
18200	,, W. G. Collings ..		,, ,,	
18215	,, W. W. Dewey ..		,, ,,	
18219	,, D. J. Robertson ..		Nursing ..	
18226	,, L. V. Bilbee ..		General Duty	
18230	,, F. Winkley ..		1st Class Clerk	
18231	,, J. Barden		General Duty	

Nursing Section.—The following appointments to the Nursing Section of the Corps will take effect from the dates specified :—

No.	Rank and Name	Date	No.	Rank and Name	Date
1925	Pte. W. Merchant ..		2208	Pte. S. H. Lake ..	3.12.09
2123	,, S. J. P. Bates ..	4.10.09	2213	,, J. J. S. Ward ..	
2170	,, W. B. Tromans..		19158	,, H. Jones.. ..	7.12.09
2186	,, H. E. Jenkins ..		19220	,, H. Ward ..	9.12.09
1964	,, H. G. Shipton ..	9.10.09	1700	,, E. Waterfield ..	
2041	,, F. C. Poole ..	12.10.09	2126	,, R. H. Hardy ..	
19975	,, R. J. Lee ..		2249	,, E. Burbage ..	
2182	,, J. McDonnell ..	25.10.09	2252	,, J. S. Scott ..	10.12.09
2187	,, H. Thomas ..		2255	,, L. F Pool ..	
1247	,, F. E. Buckland..	26.10.09	2258	,, W. Edmonds ..	
2141	,, C. Gray	1.11.09	14980	,, A. Bowden ..	
2183	,, J. Egan		2152	,, T. Armstrong ..	13.12.09
18110	Cpl. R. W. Gibson ..	12.11.09	1856	,, A. F. Leaney ..	15.13.09
296	Pte. F. G. Wilson ..	22.11.09	1607	,, W. T. Pond ..	
1463	,, W. E. Durrant ..		1684	,, E. W. Wagstaff..	
1798	,, R. R. Gilbert ..	24.11.09	1804	,, W. O'Gorman ..	
2234	,, A. Macdonald ..		1895	,, S. Bulleid ..	
2264	,, W. T. H. Blake ..		2133	,, T. C. Letton ..	17.12.09
19409	,, A. Hutchinson ..		2174	,, R. Hill	
2169	,, B. W. Hayward..	26.11.09	2206	,, L. C. Ede ..	
4353	,, G. Newman ..		2220	,, R. J. Anstey ..	
19729	,, J. Tomlin ..	3.12.09			

Advancement of Privates (Corps Pay).—The following advancements in rate of Corps Pay will take effect from January 1, 1910 :—

To be Advanced to the Third Rate (*at* 8*d*.).

As Orderlies.

No.	Name	No.	Name	No.	Name
18139	Leech, A.	19230	Coppins, J. J.	19821	Mundy, A.
18255	Barber, A.	19368	Hazell, J.	19862	Tole, L. R.
18329	Davidson, F. G.	19429	Orton, R.	29	Hart, J.
18444	Hall, A. H.	19433	Blake, H.	105	Newman, F.
18498	Ross, E. R.	19453	Wingate, A. C.	218	Dale, L. A.
18736	Franklin, E. C.	19464	Chamberlain, C.	223	Peake, W.
19031	Leahy, J.	19598	Dawes, P.	264	Trout, A.
19041	Thompson, W.	19605	Nairn, M.	560	Norris, F. J.
19073	Leach, E. W.	19646	Gosling, H. T. S.	935	Griffith-Williams, H. M.
19211	Bowen, G.	19756	Wallace, W. E.		

As Clerks.

No.	Name	No.	Name	No.	Name
16303	Cunningham, H.	19248	Hunt, J. R.	19626	White, E. F.
18330	Mercer, J. N.	19454	Renshaw, E. S.	97	Shave, A. A.
18585	Mills, F.	19508	Fenton, E.	365	Warner, W. O.
18906	Whyatt, T. G.	19567	Christie, J. T.	600	Day, A. F.

To be Advanced to the Fourth Rate (at 6d.).

As Orderlies.

No.	Name	No.	Name	No.	Name
18387	Daniels, W.	19744	Simmons, R. W.	1490	Lansdowne, E. W.
18411	Richards, G. H.	19897	Freeman, V. H.	1505	Callis, F. G.
18553	Abnett, G. H.	19921	Phelps, G.	1539	Catlin, F. G.
18821	Weston, G.	70	Handford, J.	1598	Bryant, E. C.
19098	Burley, F. P.	293	Hanchett, G.	1656	Chivers, A. H.
19251	Murphy, P. J.	894	O'Brien, W.	1713	McCarthy, F. B.
19509	Mulley, H. F.	969	McAllister, H. A.	1851	McVey, J.
19634	Kelliher, J. E.	1060	Burrell, A. J.	1913	Johnys, W. C.
19680	Davis, W.	1094	Alloway, H. B.	2201	Ring, R.
19698	Wass, M.	1368	Bunker, A.		
19711	Horstead, S. L.	1439	Ramsey, W. D.		

As Clerks.

17724	Hyde, G. R.	1412	Palmer, W. T.	1829	Lovell, A. J.
19555	Martin, P. C.	1718	Lowe, L. W.	1905	Eves, J. G.
19986	Gardener, W. H.	1759	Meenagh, J. H.	1970	Brunt, W. J. G.
411	Bowden, C. G.	1799	Stowe, S. A.	2046	Hammond, F. J.

As Cooks.

12556	Rayner, W.	18808	Steels, W.	19697	Rhodes, F.
17129	Walker, H. E.	18908	Dart, W. H.	19766	Ferdinando, G. J.
17259	Waters, T.	18937	Shaw, T.	19975	Lee, R. J.
17945	Price, A.	19015	Cunningham, J.	151	Dashfield, G. A. T.
18243	Vincent, W.	19402	Marsh, G.	1776	Rollo, J.
18799	Smith, V.	19606	Allan, J.		

Sanitary Orderlies (Corps Pay).—The following Privates are advanced to the Fourth Rate of Corps Pay at 6d., as Sanitary Orderlies, from the dates specified:—

No.	Name	Date	No.	Name	Date
18290	Diamond, P... ..	5.8.09	738	Ryan, M.	10.10.09
18386	Adye, W. E... ..	3.9.09	18423	Hanks, R. C. ..	25.10.09
1982	Walsh, J. J.	21.9.09	1564	Walter, W.	30.10.09
2171	Cosgrove, R... ..	25.9.09	19478	Pollitt, A.	2.11.09
2159	Dixon, A.	27.9.09	957	Hunt, H. A... ..	10.11.09
18628	Pemberton, G. ..	30.9.09	1410	Pratt, J. R.	10.11.09
19993	Macaulay, W. ..	1.10.09	1838	Crompton, E. J. ..	13.11.09
1268	Gray, J.	1.10.09	1553	Garvey, J.	15.11.09
108	Southwell, J. T. ..	1.10.09	2032	Wood, R. R... ..	23.11.09
2173	Aitken, T.	3.10.09	1870	Nelson, A. V. ..	7.12.09
1363	Green, H.	7.10.09	17003	Keeley, C. R. ..	11.12.09
1734	Dixon, W.	7.10.09	1518	Sawyer, C.	1.1.10

Buglers.—The following Boys are appointed Buglers from the date specified:—

No.	Name	Date	No.	Name	Date
1126	Crowe, W. M. ..	22.10.09	4405	Taylor, E. F. ..	3.12.09
1401	Baxter, E. H. ..	1.12.09			

Queen Alexandra's Imperial Military Nursing Service.—The undermentioned man has been selected for admission into Q.A.I.M.N.S., with increased pay at sixpence (6d.) a day, in accordance with Article 771, Royal Warrant for Pay, from the date specified: 18443 Private G. Harris, October 29, 1909, Ceylon.

Transfer Sections.—The following Lance-Corporal is transferred from the "Clerical Section" to the "General Duty Section" from the date specified: 17317 J. C. Reynolds, October 8, 1909.

The following Lance-Corporal is transferred from the "General Duty Section" to the "Clerical Section" from the date specified: 103 G. P. Steer, November 2, 1909.

Advancement to a Higher Rate of Corps Pay.—With reference to paragraph 63, Standing Orders, R.A.M.C., it is observed that recommendations for the advancement to higher rates of Corps Pay on Army Form B 219 are not at present being received in this office, on behalf of thoroughly deserving soldiers, in sufficient numbers to fill the vacancies in the authorised establishment, the deficiency being specially noticeable among Nurses and Cooks.

It is suggested that men under instruction should be encouraged to qualify in all respects as required by the paragraph above quoted, in order that they may be recommended for advancement.

Army Form C 344. (Certificate of Training as a Nurse).—(1) It is notified for general information that an examination for this certificate will be held on Monday, May 9, 1910, and following day.

(2) Attention is invited to paragraphs 22 and 23 of the new Appendix 2, 1A Standing Orders, R.A.M.C., 1907.

(3) With reference to paragraph 22 (1), a certificate must be forwarded stating that the fact that each candidate has satisfactorily completed the first and second year of training has been verified by the Registrar of Training, Army Book 300, and that he is at least of "Very Good" character.

(4) The names of intending candidates should be submitted to this office as early as possible, in order that the number for examination may be reported to the War Office.

(5) In addition to above, the names of any candidates who have already passed and who are eligible, and are desirous of being examined under paragraph 22 (v) (Special Subjects), should also be submitted at the same time, but on a separate list.

DISCHARGES.—5772 Serjeant-Major E. Foy, February 3, 1910, to pension; 8284 Quartermaster-Serjeant J. Southwood, January 25, 1910, termination of second period; 7839 Quartermaster-Serjeant M. Powell, January 24, 1910, after three months' notice; 8311 Quartermaster-Serjeant A. Ward, February 4, 1910, termination of second period; 8294 Staff-Serjeant D. W. Hannan, January 31, 1910, termination of second period; 6911 Staff-Serjeant Pitchforth, January 24, 1910, after three months' notice; 7886 Staff-Serjeant J. J. Rampton, February 9, 1910, after three months' notice; 7760 Staff-Serjeant W. Furness, February 16, 1910, after three months' notice; 8329 Serjeant H. G. Wales, February 19, 1910, termination of second period; 8331 Serjeant W. Hinton, February 20, 1910, termination of second period; 8767 Corporal W. Diggins, December 31, 1909, after eighteen years' service; 18777 Private W. Aylett, January 4, 1910, medically unfit; 18591 Private W, Dexter, January 31, 1910, termination of first period,

TRANSFERS TO ARMY RESERVE.—17039 Private J. W. Elliott, January 12, 1910; 17048 Private T. R. James, January 14, 1910; 17051 Private W. A. Potts, January 15, 1910: 17054 Private A. Altoft, January 12, 1910; 17112 Private W. McDonald, January 16, 1910; 1079 G. J. Colquhoun, December 22, 1907; 17173 Private C. W. Brittell, January 17, 1910; 1832 Private H. Judd, January 14, 1910; 1967 Private H. J. Nixon, January 17, 1910; 17085 Private J. O'Connor, January 16, 1910; 17151 Corporal J. T. Brown, January 26, 1910; 17161 Private J. Riley, January 28, 1910; 17116 Private G. Warburton, January 21, 1910; 17103 Corporal A. Linn, January 16, 1910; 17146 Lance-Corporal A. A. Trower, January 21, 1910; 17120 Private O. W. Wilson, January 21, 1910; 17174 Private F. C. Wilson, January 20, 1910; 17104 Private P. Harrison, January 20, 1910; 17061 Private R. A. Bagus, January 17, 1910; 19016 Private J. Claxton, January 19, 1910; 2251 Private B. H. Cooke, January 22, 1910; 17911 Private C. Brittell, January 23, 1910; 1077 Private R. Mead, January 23, 1910; 17148 Private A. Woodforde, January 23, 1910; 17154 Private J. J. Mahalm, January 26, 1910; 17119 Private J. Holbrook, January 24, 1910; 17152 Private Frampton, January 26, 1910; 17098 Private D. Dickson, January 26, 1910; 17181 Private J. Craig, January 28, 1910; 17157 Private M. Heaver, January 27, 1910; 17150 Private J. E. Connolly, January 26, 1910; 17180 Corporal D. A. Norwood, January 27, 1910; 17178 Private G. A. Inginide,

January 26, 1910; 17153 Corporal A. Law, January 26, 1910; 17155 Private J. Riggs, January 26, 1910; 17168 Private F. Powell, January 31, 1910; 17232 Private J. Baker, January 30, 1901; 17436 Private R. Bowman, January 29, 1910; 17087 Private A. Jones January 28, 1910; 17169 Private W. Andrews, February 2, 1910; 18174 Private A. Jacques, January 31, 1910; 17212 Private F. Haskell, February 9, 1910; 17243 Private H. C. Pickard, February 13, 1910; 17228 Corporal A. G. Thompson, February 12, 1910.

PROMOTIONS.—A copy of Corps Orders, dated January 1, 1910, attached.

To be Serjeant Major.—9850 Quartermaster-Serjeant W. A. Taylor, January 26, 1910, *vice* C. W. Kinsella to H.M. Com.; 9990 Quartermaster-Serjeant W. Wilson, February 4, 1910, *vice* E. Fry to pension.

TRANSFERS TO OTHER CORPS.—12505 Serjeant E. Shepherd, February 12, 1910, to Egyptian Army.

TRANSFERS FROM OTHER CORPS.—4810 Private G. J. Wilkins, January 1, 1910, from 7th Dragoon Guards; 4824 Private W. D. Burnell, January 21, 1910, from A.S.C.

EMBARKATIONS FOR ABROAD.

For South Africa, per H.T. "Soudan," February 9, 1910: 9850 Serjeant-Major W. A. Taylor, 10711 Staff-Serjeant F. W. Sharpe, 12248 Serjeant W. Gamblen, 12495 Serjeant T. H. Brewer, 12743 Serjeant T. R. Wilson, 18645 Serjeant C. E. Rouse, 11628 Corporal T. A. Fullam, 18970 Corporal J. Higginbottom, 14569 Corporal F. Littleworth, 17427 Corporal L. Higgins, 1056 Private W. J. Bennett, 1071 Private J. A. Stocker, 1277 Private P. Lynch, 1372 Private J. J. Fuller, 1456 Private F. F. Hird, 1574 Private H. Price, 1618 Private R. H. Key, 1975 Private W. Hawkes, 17967 Private C. Wren, 1344 Private W. C. Shelley, 19098 Private F. P. Burley, 1017 Private W. W. F. Gattrell, 2019 Private G. J. Williamson, 260 Private P. Renouf, 337 Private J. Loxley, 303 Private F. Hicks, 286 Private G. Howard, 727 Private W. A. Collis, 705 Private J. W. Sinclair, 1355 Private J. Wilson, 1847 Private R. W. Ogg, 1405 Private D. Foley, 1448 Private W. A. Moore, 17125 Private M. Brockbank, 1921 Private H. W. Bloomer, 669 Private F. A. Marlborough, 2150 Private E. G. Fraser.

DISEMBARKATIONS FROM ABROAD.

From Egypt, per ss. "Seti," January 22, 1910: 12365 Serjeant W. L. Brodie, 14958 Serjeant H. Soady.

From Malta, per H.T. "Dongola," January 20, 1910: 8395 Serjeant-Major R. Stanley, 14686 Corporal W. A. Wilson, 17555 Corporal M. Kinder, 17379 Lance-Corporal E. Hardy, 18571 Private F. T. Pepper, 19160 Private C. J. Preston, 18671 Private S. Thackary, 19186 Private T. E. Smith, 2114 Private H. S. Stokes, 19075 Private H. S. Skelton, 12393 Private M. Rowland, 18621 Private A. J. Walton, 18673 Private C. W. Bidgood, 18234 Private R. J. Gibbons, 19416 Private F. E. Harper, 12121 Private G. W. H. Mean, 19547 Private W. A. Mansell.

THE FOLLOWING N.C.O.'S AND MEN HAVE QUALIFIED FOR PROMOTION IN THE VARIOUS CORPS EXAMINATIONS:—

For Staff-Serjeant.—15983 Serjeant C. E. Lister, 12623 Serjeant H. S. Rolfe, 12352 Serjeant J. H. Curtis.

For Serjeant.—11327 Corporal M. K. Quinlan.

For Corporal.—1875 Private J. E. Kitchen, 15803 Private H. B. Stuart, 19272 Private W. J. Lee, 19673 Private F. C. W. Folwell, 19838 Private R. Tothill, 18559 Private M. Day, 19011 Private G. E. Egan, 1430 Private W. T. Perkins.

NOTES FROM THE LONDON DISTRICT.

AFTERNOON CONCERT GIVEN BY *The Daily Mirror* AT THE QUEEN ALEXANDRA MILITARY HOSPITAL, GROSVENOR ROAD, S.W., ON FEBRUARY 1, 1910.

Through the kindness of the well-known and enterprising London paper, *The Daily Mirror*, an exceptionally high-class afternoon concert was given to the patients of the Queen Alexandra Military Hospital, Grosvenor Road, S.W., on February 1 last, at 3 p.m. Many of the most famous actresses, actors, and musicians in London contributed items. Seldom has a more enthusiastic audience assembled in a concert hall, and from the opening pianoforte solo, admirably played by Mr. Harold Samuel, to the last selection on the programme, the applause was whole-hearted and unstinted. The concert was held in one of the large wards of the hospital, and its great success was entirely due to Mr. Stanley Austin, the representative of *The Daily Mirror*, who took the greatest trouble in organising and arranging the entertainment. Mr. Reginald

Walter, of the Wyndham Theatre, ably supervised the stage arrangements, and Messrs. John Broadwood and Sons kindly lent one of their grand pianos for the occasion.

After the concert the artistes and guests were entertained at tea by the Royal Army Medical College Mess, where Colonel Wardrop and the officers of the Royal Army Medical Corps were "at home."

PROGRAMME.

1. *Pianoforte Solo* .. .. Mr. HAROLD SAMUEL.
2. *Musical Recitation* 'A Gentleman of France' (*S. Walsh*) .. Mr. SAM WALSH.
3. *Song* .. .. .. 'Songs of Araby' (*F. Clay*) .. Mr. COURTICE POUNDS.
4. *Story* .. .. 'The Swineherd' (*Hans Andersen*) Miss CHRISTINE SILVER.
   (By kind Permission of Mr. Herbert Trench.)
5. *Humorous Song*.. .. .. Mr. TOM CLARE.
6. .. .. 'Stories from My Répertoire' .. Miss DECIMA MOORE.
7. *Song* .. .. .. 'Göelands' (*H. Bemberg*) .. Lady CLARKE-JERVOISE.
8. *Recitation with Music* (*Stanley Hawley*) .. .. .. Miss LENA ASHWELL.
   (Accompanied by the Composer) (Lessee Kingsway Theatre).
9. *Pianoforte Solo* .. .. Mr. HAROLD SAMUEL.
10. .. .. 'Stories' .. .. ..Mr. JAMES WELCH.
   (Criterion Theatre, 'When Knights were Bold.)
11. *Song* .. .. (*a*) 'Rainbow' (*Henshell*) (*b*) 'Annie Laurie' (*Old Scotch Ballad*) .. Miss VIOLA TREE.
12. *Violoncello* .. (*a*) 'Romance' (*Boehmann*) (*b*) 'Chant sans Paroles' (*Tchaikovsky*) Mr. BORIS HAMBOURG.
13. *Recitation* .. .. 'Tommy' (*Rudyard Kipling*) .. Miss HILDA TREVELYAN.
   (By kind Permission of Mr. Chas. Frohman) 'Wendy' in 'Peter Pan.'
14. *Humorous Song*.. .. .. Mr. HUGH E. WRIGHT.
15. *Dance* .. .. Miss MARJORY DANE.
   (Leading Child in 'Where Children Rule.')
16. *Recitation* .. 'The Confession of "Am. Climes"' Mr. STEPHEN BOND.
17. *Humorous Song*.. .. .. Mr. T. C. STERNDALE BENNETT.

Accompanist .. .. Mr. HAROLD SAMUEL.
Hon. Stage Manager .. .. .. Mr. REGINALD WALTER.
(By kind Permission of Sir Charles Wyndham).

Mr. Sam Walsh delighted his hearers with his well-known musical recitation, "A Gentleman of France," and was followed by Mr. Courtice Pounds—who had travelled from Bristol specially to entertain the sick soldiers—who sang "Songs of Araby" and "On the Road to Mandalay." The greatest enthusiasm greeted the singing of the latter song, notably amongst a certain section of the audience, who clearly "heard the East a' calling." "The Swineherd," a story by Hans Andersen, was charmingly told by Miss Christine Silver, and Miss Decima Moore, the well-known actress, sang a song and recited a poem, which won the soldiers' heartiest applause. They were equally appreciative of Lady Clarke-Jervoise, who, with a drum at her side, gave a dashing soldier song. Miss Lena Ashwell, the famous actress-manageress, sang three delightful songs by Mr. Stanley Hawley, who himself accompanied. Then followed Mr. James Welch, the "When Knights Were Bold" comedian, who told stories, and Miss Viola Tree, the daughter of Sir Herbert Tree, who rendered two charming songs. Mr. Boris Hambourg's violoncello solos were greatly appreciated, and Miss Hilda Trevelyan, the Wendy of "Peter Pan," made a tremendous hit with Kipling's poem, "Tommy." Little Miss Marjory Dane, Mr. Stephen Bond, Mr. Sterndale Bennett, Mr. Tom Clare, and Mr. Hugh E. Wright also gave their services, their contributions being enthusiastically applauded.

Amongst those who received invitations were: Lord Longford (2nd Life Guards), Lord Cavan (Grenadier Guards) and Lady Cavan, Lord Stanhope, Lord Gort (Grenadier Guards), Sir Alfred Keogh (Director-General A.M.S.) and Lady Keogh, Surgeon-General Gubbins (Deputy-Director-General A.M.S.) and Mrs. Gubbins, Colonel Wardrop (Commandant Royal Army Medical College), Mrs. and Miss Wardrop, Sir A. S. Wynne (Military Secretary) and Lady Wynne, Major-General and Mrs. Codrington, Major-General Dawson and Lady Dawson, Sir William and Lady Leishman, Colonel and Lady Blanche Granville Smith, Miss Keer (Matron-in-Chief Q.A.I.M.N.S.), Miss McCarthy (Matron), the Nursing Sisters and Staff-Nurses Q.A.I.M.N.S., Major and Hon. Mrs. Hore Ruthven, Colonel Hon. W. E. and Mrs. Cavendish, Colonel Hon. W. Lambton, Colonel and Mrs. Nugent, Colonel and Lady Susan Gordon Gilmour, Colonel

and Mrs. Maxee, Colonel and Mrs. Cuthbert, Colonel and Mrs, Drummond Hay, Colonel and Mrs. Childers, Major and Hon. Mrs. Earle, Colonel and Lady D. Ruggles Brise, Colonel and Mrs. Melville, Colonel and Mrs. Peterkin, General and Hon. Mrs. Heneker, Major Spencer and the Misses Heathy, Colonel Magill, Colonel Harrison, Major and Mrs. Harrison, Colonel Becher, Major and Mrs. D. J. Collins, Rev. Dr. and Mrs. Hackett, Rev. Mr. White, Rev. Father Foster, Miss Trotter, Mrs. Chamberlain, Major Gregson, Mr. Arthur and Mrs. Barker, Dr. Walter Griffiths, Captain and Mrs. Hayes, Captain and Mrs. Potter, Captain Kennedy, Captain Rutherford, Captain Goodwin, Miss Lucas, Miss Thurston, Mr. and Mrs. McCarthy, Major Ward, Mr. and Mrs. Ward, Mr. and Mrs. Neville, Mrs. Monk.

NOTES FROM WOOLWICH.—Serjeant-Major Green writes:—

"CHRISTMASTIDE AT WOOLWICH.

"The customary round of Christmas festivity was entered into by the staff and patients at the Royal Herbert Hospital at Woolwich with genuine enthusiasm, and all arrangements were carried out without the slightest hitch.

"*Church Service.*—On Christmas morning the service in the hospital chapel, a pretty chapel at any time but doubly pretty on Christmas morning, with its tasteful white floral decoration, was attended by a large congregation, not a vacant seat being available.

"*Decorations.*—To describe the details of the decoration of our establishment would require a page of the journal, and as that space cannot be available at this time of the year, let me cast a cursory glance over this branch of the arrangements. The wards, chapel, patients' dining hall, and patients' theatre were all very tastefully decorated under the supervision of the Matron, Miss Russell, and the nursing staff. No. 1 barrack room was lavishly decorated by the occupants under the direction of Corporal Hearn, whilst the company dining hall was also tastefully decorated by an energetic sub-committee under Corporal Tovell. The artistic work of Privates Steedman and Myers certainly deserves special mention, their character sketches on the walls being pronounced generally as "awfully good."

"*Patients' Christmas Dinner and Tea.*—The patients' dinner was a sumptuous one, and included every delicacy. The Administrative Medical Officer (Lieutenant-Colonel W. Dick), accompanied by the Officers in Charge of Divisions (Lieutenant-Colonels Sutton and Wilson), the Registrar and Officer Commanding Companies (Major T. P. Jones), the Adjutant (Captain J. M. M. Crawford), and a number of other officers and ladies toured the wards, dining-hall, &c., during dinner, to wish those who were unfortunately forced to be patients the compliments of the festive season. A splendid tea was provided for the patients by the Matron and Sisters about 5.30 p.m., which was followed by an excellent impromptu concert, also arranged by the Sisters.

"A word of praise is certainly due here to our master cook, Serjeant Harrington, and his staff for their excellent culinary arrangements.

"*The Company Dinner.*—The company dinner to which nearly 100 sat down was a great success. The sub-committee, composed of Corporals Guernsey and Baker, and Privates Walsh, Garvey, Hazell, and Johnston showed themselves well worthy of their selection.

"Nothing could be said to be wanting either in the variety or quantity of the good things provided, and the cooking left nothing to be desired.

"The Assistant Medical Officer, Commanding Officer, and Adjutant, with quite a number of other officers and their wives, also the Matron and Sisters, visited the companies during dinner. The seasons' greetings were heartily tendered by the Assistant Medical Officer and Commanding Officer, and suitably responded to. After dinner the tables were re-arranged, and the afternoon and evening were spent in a most convivial manner, Corporal Hearn acting as chairman for the occasion.

"*Patients' Tea and Entertainment.*—On Monday (Boxing Day) the patients were again regaled with a special tea arranged by the Matron and Sisters, followed by an excellent entertainment given by the Keith-Prowse party in the patients' theatre. The hearty applause the artistes received gave them much encouragement and showed them how much their efforts were appreciated. The programme was a variety one, and included some excellent turns.

"*Families' Entertainment and Christmas Tree.*—Our married folk had a most enjoyable afternoon and evening on Tuesday, December 28, an entertainment, tea, and Christmas tree having been organised for their benefit by Mrs. Dick, Mrs. Sutton, Mrs. Wilson, Mrs. Jones, and the wives of the other officers. First of all there was an old-time form of entertainment in the shape of marionettes, and old as well as young were kept highly amused for over an hour and a half. Then came the tea, at which there were about 40 of the wives and double that number of children present.

"The tea was an excellent one, enough and to spare for everyone, and the attention bestowed by the officers and their wives went a long way towards making the large party a most enjoyable one indeed. However, hospitality did not end here, for on adjourning from tea to another room a tremendous Christmas tree was discovered loaded with splendid Christmas presents for everyone. These were duly distributed by Father Christmas (Lieutenant Leeson for the occasion) assisted by Mrs. Dick, Mrs. Sutton, and Mrs. Wilson. It was a long time before the tree, which was, by the way, lit by electric fairy lights, was unloaded, so many presents having to be disposed of. However, once this was done, and after many expressions of thanks to the ladies who had spent so much time and trouble, to say nothing of expense, towards making the gathering such a success, the party commenced to break up, each child before leaving being presented with a bag of sweets, bon-bons, and fruit. This annual gathering is the only occasion on which many of our wives and children meet each other, and this adds an additional pleasure to its results.

"*Serjeants' Mess Soiree.*—The Annual New Year's Soiree was held on December 29, when they entertained about eighty guests. An excellent vocal programme was given the Paul-Jeffrey Concert Party, and the dance music was splendidly rendered by the Somers Band. Everyone seemed to thoroughly enter into the enjoyment of the evening, and a most happy time was spent. The programme will speak for itself.

"PROGRAMME.

1.	*Waltz*	'Songe d'Automne'	
2.	*Trio*	'Come Fairies, trip it on the Grass'	*Parry,*
		Misses Rubie Grey and Lilian Garwood, and Mr. James Paul.	
3.	*Lancers*	'Roderick Dhu' (Geisha)	
4.	*Song*	'Serenades'	
		Mr. Osborne Morgan.	
5.	*Barn Dance*	'Sue'	
6.	*Song*	'In a Child's Small Hand'	*Guy Engelhardt.*
7.	*Waltz*	'Lilian'	
8.	*Military Two-Step*	'Teddy Bear's Picnic'	
9.	*Song*	'The Bo'sun, the Gunner, and Me'	*Trotère.*
		Mr. James Paul.	
10.	*Quadrilles*	'Harry Lauder'	
11.	*Schottische*	'Dance of the Curly Wigs'	
12.	*Song*	'Poor Wandering One'	*Sullivan.*
		Miss Rubie Grey.	
13.	*Veleta*—Original		
14.	*Lancers*	'Gaiety'	
15.	*Song*	'It's no Trouble, it's a Pleasure'	*Kent.*
		Mr. Harry Jeffrey.	
16.	*Duet*	'Greeting'	*Mendelssohn.*
		Misses Rubie Grey and Lilian Garwood.	
17.	*Waltz*	'Quo Vadis'	
18.	*Song*	'I had a Little Garden'	*Hanray.*
		Mr. Osborne Morgan.	
19.	*D'Alberts*—Selected.		
20.	*Duet*	'The Land of Make-Believe'	*S. Jones.*
		Misses Rubie Grey and Lilian Garwood.	
21.	*Grand March Lancers*	'Le Militaire'	
22.	*Monologue*	'Who'll have a Blood Orange'	*Pona.*
		Mr. Osborne Morgan.	
23.	*Barn Dance*	'High Jinks'	
24.	*Veleta*—Original.		
25.	*Duet*	'The Jovial Blacksmiths'	*Gordon.*
26.	*Schottische*—Selected.		
27.	*Circassian Circle.*		
28.	*Quartette*	'The Banks of the I.O.U.'	
29.	*Barn Dance*	'Canadian'	
30.	*Waltz*	'Bells of Dawn'	

"'God Save the King.'

Accompanists—Vocal—Mr. Jeffrey and Miss Garwood
Dance—Messrs. Somers.

"The Officers' Library was very kindly left at the disposal of the members of the mess for the occasion, and, together with their own splendid room, the accommodation was ideal. A large number of officers (among them Lieutenant-Colonel Dick, A.M.O., and Lieutenant-Colonel Wilson) with their wives were present. The rooms were beautifully decorated, and the dresses of the ladies lent a charming effect to quite a brilliant gathering. Many were the compliments paid by members of outside corps on the style and arrangement of this form of entertainment, which is somewhat out of the ordinary, but evidently much appreciated.

"*Company Smoking Concert.*—New Year's Eve brought our series of entertainments to a close with the annual smoker. This is an event to which the rank and file look forward, and on this occasion it was a success over previous successes. The programme, which follows, was good, refreshments (eatable and drinkable) were plentiful, and the company a large and highly convival one. The Chairman (Serjeant-Major Green) who was supported by Corporal Hearn as Vice-Chairman, proposed at intervals the toasts 'Our Officers,' 'Our visitors,' and 'Absent Friends.' These were suitably received and responded to, Major Jones replying for the officers in a speech which was enthusiastically received by those present. 'Auld Lang Syne' was sung punctually at midnight, and the company dispersed, one wishing the other a 'Happy New Year.'

"PROGRAMME.

1.	*Pianoforte Selection*		PTE. McMURDO.
2.	*Comic Song*	'Let's all go down the Strand'	PTE. EMERY.
3.	*Song*	'My Home is Far Away'	PTE. PARKINS.
4.	*Humorous Song*	'What's the Use'	Mr. OSBORNE MORGAN.
5.	*Song*	'Chiming Bells'	S.-SERGT. GRANGER.
6.	*Comic Song*	'Geography'	Mr. HARRY LESLIE.
7.	*Song*	'Big Ben'	Mr. CRAMP.
8.	*Piano Sketch*	'Familiarity'	Mr. HARRY JEFFERY.
9.	*Song*	'In Happy Moments'	Mr. DELANEY.
10.	*Humorous Song*	'My Beastly Eyeglass'	Mr. OSBORNE MORGAN.
11.	*Coon Song*	'Little Wooden House in Norway'	PTE. LAWRENCE.
12.	*Comic Song*	'Living Animals'	Mr. HARRY LESLIE.
13.	*Song*	'The Bo'sun, the Gunner, and Me'	Mr. JAMES PAUL.
14.	*Song*	'Wait till You Find the Right Little Girl'	PTE. LAWRENCE.
15.	*Monologue*	'The Motor Car'	Mr. OSBORNE MORGAN.
16.	*Song*	'Fill Your Glasses Full'	SGT.-MAJOR GREEN.
17.	*Song*	'The Wolf'	Mr. CRAMP.
18.	*Humorous Song*	'I'm not Satisfied'	Mr. HARRY JEFFERY.
19.	*Song*	'Asleep in the Deep'	Mr. JAMES PAUL.
20.	*Monologue*	'Oh! Memory'	Mr. HARRY LESLIE.
21.	*Descriptive Song*	'Gibraltar'	PTE. PARKINS.
22.	*Humorous Song*	'It's no Trouble, It's a Pleasure'	Mr. HARRY JEFFERY.
23.	*Song*	'My Old Shakoo'	Mr. JAMES PAUL.
24.		'AULD LANG SYNE.'	

"'GOD SAVE THE KING.'"

NOTES FROM DUBLIN.—Serjeant Dewberry writes :—

"AN INTERESTING MARGARINE PROSECUTION AT DUBLIN.

"*Secretary of State for the War Department against Messrs. Daniel Murphy, Ltd., 25 & 26, Mary's Abbey, Dublin.*

"This came before Mr. Mahony (the Magistrate in the Northern Police Court, Dublin) on December 21, 1909.

"The allegation was that the defendants, on October 25, 1909, sold to complainant *as* 'butter' an article which was not of the *nature, substance*, and *quality* demanded. (The contract was to supply '*Butter*' to the Royal Infirmary, Dublin.)

"Mr. Ball, solicitor (Chief Crown Solicitor's Department) prosecuted, and Mr. Burne, solicitor, appeared for the defence.

"Evidence was given by officers, N.C.O.'s, and men (of the Royal Army Medical Corps) connected with the staff of the Royal Infirmary and District Laboratory as to the delivery of the article in question by a vanman in the employment of the defendants. Samples were taken, and one sent by special messenger to the District Laboratory, where it was analysed.

"The evidence of Captain D. O. Hyde, R.A.M.C. (acting Specialist Sanitary Officer, Dublin District), was that the substance was margarine.

"Mr. Burne, for the defence, raised the point that a sample having been taken for test purposes the prosecution should have been brought within twenty-eight days. By way of further defence, he said that the vanman made a mistake and delivered the wrong parcel. Mr. Ball urged for the prosecution, that the article delivered to the Infirmary was not of the nature, substance, and quality demanded by the contract (a copy of which was in court) under the Food and Drugs Act.

"At the close of the hearing Mr. Mahony (Magistrate) said: I will convict in this case. Messrs. Murphy carry on a large and prosperous business in Mary's Abbey. It is well known to be a prosperous firm, having a very large business in the centre of the poorest and most squalid district of the city. I am sure prosperous people also deal with them, but the poorest and most wretched classes are their principal customers, and if this is done in the 'green wood' what must be done in the 'dry.' If they committed this fraud on the War Office, what must they do on the poor, wretched people about Mary's Abbey. It is not merely committed on the healthy military, but on the military invalids—this gross, mean, atrocious wrong. I impose the maximum penalty of £20 (£1 1s. costs). If the perpetrators spent Christmas in gaol it would be with the full assent of the community.

"On the application of Mr. Burne, His Worship agreed to state a case for the decision of the Higher Court.

"The following is a list of the witnesses for the prosecution: Captain D. O. Hyde, R.A.M.C., Acting Specialist Sanitary Officer, Dublin District; Quartermaster and Honorary Captain G. F. Short, R.A.M.C. (who witnessed the taking of the sample); Staff-Serjeant H. J. Angell, R.A.M.C., Steward, Royal Infirmary (who actually took the samples); Bugler W. Collier, R.A.M.C., messenger; Serjeant E. B. Dewberry, R.A.M.C., Laboratory Assistant.

"There were *no* witnesses for the defence.

"*Remarks.*—The above case goes to show that even in these enlightened days a sharp look-out must be kept on firms contracting for the Service. This can only be done by constant sampling at the time of delivery of the goods at the hospitals, and the samples being taken in accordance with the Food and Drugs and Public Health Acts."

NOTES FROM WYNBERG.—Serjeant-Major C. W. Kinsella, R.A.M.C., writes: "Christmas passed off in a pleasant manner. The officer commanding (Lieutenant-Colonel S. Hickson) visited the married quarters, and, subsequently, the men's dinner, where the officers of the Company were also assembled, and in the course of a few pithy remarks mentioned the names of those who had either qualified for or obtained advancement during the year, and to whom he offered his congratulations. Replying for the Company, Serjeant-Major Kinsella returned thanks to the officer commanding and officers for their kindly interest, and proposed the health of the Administrative Medical Officer, the Officer Commanding, and Officers, which was accorded with musical honours.

"In the evening a smoking concert was held, several officers and the married families attending. The Recreation Room had been tastefully decorated with suitable mottoes, and the energetic committee under Quartermaster-Serjeant Fleming are to be congratulated on a successful day. The patients were also not forgotten, a spread of good things being organised by Miss M. E. Denne (Acting Matron) and the Nursing Sisters.

"On January 22, the Company had their annual outing to Hout Bay. A pleasant drive brought the party to the Royal Hotel, where an excellent dinner was spread, and the afternoon was whiled away with sports, swimming, &c. High tea followed, the party returning to barracks about 8 p.m., after a thoroughly enjoyable day. A picnic for the married families is being arranged.

"Majors Collins and Buist and Captain Hanafin have sailed for England, and Lieutenant-Colonel Caldwell, Major Forde, and Captain Ievers have joined for duty in relief."

NOTES FROM CALCUTTA.—Lieutenant-Colonel R. S. F. Henderson, R.A.M.C., Secretary to Principal Medical Officer, H.M.'s Forces in India, writes as follows, dated January 20, 1910:—

"*Appointments.*—Following officers have been appointed Honorary Surgeons to His Excellency the Viceroy:—

"Surgeon-General A. T. Sloggett, C.M.G.

"Colonel R. H. Forman, M.B.

"Lieutenant-Colonel R. S. F. Henderson, M.B., R.A.M.C.

"*Specialists.*—The following officers are appointed specialists in the subjects named, with effect from the dates of assuming duties: (c) *Advanced Operative Surgery*, Captain

J. G. Churton, 1st (Peshawar) Division. (*e*) ***Electrical Science***, Captain J. W. L. Scott, 4th (Quetta) Division. (*h*) *Midwifery and Diseases of Women and Children*, Major M. Swabey, 5th (Mhow) Division."

NOTES FROM SINGAPORE.—Serjeant-Major Ford writes (Christmas, 1909): "A very enjoyable Christmas was spent by the 32nd Company, Royal Army Medical Corps, stationed at Tanglin. A company of forty-five, including representatives from all Departmental Corps stationed in Singapore, assembled for dinner at 6 p.m. The officers present were Lieutenant-Colonel Barrett, R.A.M.C., Major I. A. O. MacCarthy, Captain and Mrs. Taylor.

"Serjeant-Major Ford opened the proceedings by proposing the health of Lieutenant-Colonel Barratt and officers of the Royal Army Medical Corps. The toast was responded to most heartily.

"Corporal Blackman proposed the health of Major I. A. O. MacCarthy, the commanding officer of the 32nd Company, which was received with great applause.

"Staff-Serjeant Haynes proposed a toast to Captain and Mrs. Taylor and all officers of the Royal Army Medical Corps at home and abroad, which was heartily responded to.

"Lieutenant-Colonel Barratt responded on behalf of the officers present, his short speech was well received, and three most hearty cheers were given.

"On a signal from the Serjeant-Major, the "Warriors" made a determined attack on the well-spread tables, and looking much better for their Christmas feeding, the Company retired to the concert room (which had been most tastefully decorated under the supervision of Private Marsh, R.A.M.C.), and rendered with their mutual friends (including representatives of the Navy from H.M.S. Kent), the following excellent programme:—

Pianoforte Solo ..	.. 'Chant sans Paroles' (*Tschaikowsky*)	Pte. J. Day, R.A.M.C.
Song	.. 'Pal of Mine' .. .. (Most pathetic)	Pte. Arnott, R.A.M.C.
Song	'By the side of the Zuyder Zee' (To say nothing of the Schnapps)	Pte. Harland, R.A.M.C.
Song	.. 'My home is far away' .. (Rather appropriate)	Pte. Marsh, R.A.M.C.
Song	.. 'Song without a Chorus' .. .. (Sung minus a voice)	Bandsman Boyce, 3rd Middlesex Regt.
Cornet Solo	'Carnival de Venise' (*Oesten*) .. (Admirably rendered)	Corpl. Orrell, 3rd Middlesex Regt.
Song	.. 'In the Pale Moonlight' (Rather alluring)	Pte. Greenaway, R.A.M.C.
Song	'A Warrior Bold' (From experience)	Staff-Serjt. Haynes, R.A.M.C.
Song	'The Song that reached my Heart' (By the aid of whiskey)	P. O. Dean, Royal Navy.

"Interval.

"During the interval Staff-Serjeant Haynes assumed the duties of Chairman and made some elegant speeches on 'Perfection' à la Saunderson Brand.

Song	'The Merrymakers' .. .. .. (One of the best)	Mrs. Ford.
Song	'Dear Home far across the Sea' (Drawing closer each day, though)	Serjt. Suter, R.A.M.C.
Song	'Would you mind passing the Salt?' (For an emetic)	Serjt.-Major Ford, R.A.M.C.
Song	.. 'Daddy' .. .. .. (Without a family)	Serjt. Moore, 3rd Middlesex Regt.
Song	'I've a Letter in my Pocket' (To call me home again)	Corpl. Halliday, R.A.M.C.
Song	'Oh, those Wedding Bells' .. .. (Were very sweet)	Mrs. Rees.
Song	'Cruise of the Ancient Lights' .. (Composed during a typhoon)	Pte. Egan, R.A.M.C.
Song	.. .. 'Boozing' .. .. .. (And I haven't had any for months)	Serjt. Moore, 3rd Middlesex Regt.
Song	.. .. 'No. 9' .. (For December 26, 6 a.m.)	Serjt.-Major Ford, R.A.M.C.,

"A very pleasant evening was brought to a close by the singing in a hearty style of "'God Save the King.'

SPECIAL RESERVE OF OFFICERS.

ROYAL ARMY MEDICAL CORPS.

Supplementary List.

George Henry Shand, M.B., to be Lieutenant (on probation) dated January 20, 1910.

TERRITORIAL FORCE.

6th Battalion, The Sherwood Foresters (Nottinghamshire and Derbyshire Regiment).—Surgeon-Lieutenant Arthur W. Shea, to be Surgeon-Captain, dated April 1, 1908.

ROYAL ARMY MEDICAL CORPS.

4th Southern General Hospital.—William Henry Scrase, to be Quartermaster, with the honorary rank of Lieutenant, dated January 22, 1910.

5th Battalion, The South Staffordshire Regiment.—Surgeon-Major James S. Wilson, M.D., from the 2nd Volunteer Battalion, The South Staffordshire Regiment, to be Surgeon-Major, with precedence as in the Volunteer Force, dated April 1, 1908.

Surgeon-Major James S. Wilson, M.D., to be Surgeon-Lieutenant-Colonel, dated May 7, 1908.

ROYAL ARMY MEDICAL CORPS.

3rd North Midland Field Ambulance.—Charles Algernon Stidston, M.D., to be Lieutenant, dated December 7, 1909.

Sanitary Service.—Charles Milton Fegen, to be Captain, whose services will be available on mobilisation, dated January 7, 1910.

Attached to Units other than Medical Units.

The transfer from the 2nd Volunteer Battalion, The South Staffordshire Regiment, of Surgeon-Major James S. Wilson, M.D., which was announced in the *London Gazette* of November 6, 1908, is cancelled.

Surgeon-Lieutenant-Colonel James Scott Wilson, M.D., from the 5th Battalion, The South Staffordshire Regiment, to be Lieutenant-Colonel, dated May 8, 1908.

Lieutenant-Colonel James S. Wilson, M.D., resigns his commission, and is granted permission to retain his rank and to wear the prescribed uniform, dated October 31, 1909.

For attachment to Units other than Medical Units.

George Denbigh Collen, M.D., to be Lieutenant, dated December 16, 1909.

UNATTACHED LIST FOR THE TERRITORIAL FORCE.

Second Lieutenant (Provisional Captain) Robert Davies-Colley (serving with the Medical Unit of the University of London Contingent, Senior Division, Officers Training Corps) to be Lieutenant, dated January 16, 1909.

Second Lieutenant (Provisional Captain) Archibald M. H. Gray, M.D. (serving with the Medical Unit of the University of London Contingent, Senior Division, Officers Training Corps), to be Lieutenant, dated January 16, 1909.

Second Lieutenant (Provisional Lieutenant) Thomas B. Layton (serving with the Medical Unit of the University of London Contingent, Senior Division, Officers Training Corps), to be Lieutenant, dated January 16, 1909.

Second Lieutenant (Provisional Lieutenant) John C. Briscoe, M.D. (serving with the Medical Unit of the University of London Contingent, Senior Division, Officers Training Corps), to be Lieutenant, dated April 1, 1909.

ROYAL ARMY MEDICAL CORPS.

1st Western General Hospital.—Allen Naldrett to be Quartermaster, with the honorary rank of Lieutenant, dated May 1, 1909.

Attached to Units other than Medical Units.

Lieutenant John F. Crombie to be Captain, dated June 24, 1909.

Captain John R. Armstrong, M.D., resigns his commission, dated January 1, 1910.

1st Southern General Hospital.—Quartermaster and Honorary Lieutenant Howard J. Collins resigns his commission, dated December 31, 1909.

For attachment to Units other than Medical Units.

Surgeon-Major John W. Nicholson, from the 5th Battalion, The Lincolnshire Regiment, to be Major, with precedence as from January 28, 1909, dated December 24, 1909.

Surgeon-Captain John M. Duncan, M.B., from the 5th Battalion, The Lincolnshire Regiment, to be Captain, with precedence as from July 4, 1903, dated December 24, 1909.

Harold Linton Heslop, M.D., to be Lieutenant, dated January 11, 1910.

ROYAL ARMY MEDICAL CORPS.

3rd East Anglian Field Ambulance.—Captain Josiah Oldfield, M.D., to be Major, dated January 6, 1910.

1st West Lancashire Field Ambulance.—The appointment of Captain Arthur J. Evans is antedated to July 14, 1909.

MILITIA.

Channel Islands, The Royal Militia of the Island of Jersey.—Charles Noble Le Brocq to be Surgeon-Lieutenant, dated January 8, 1910.

QUEEN ALEXANDRA'S IMPERIAL MILITARY NURSING SERVICE.

Postings and Transfers.—Matrons: Miss C. H. Potts, to Chatham, on return from South Africa. Sisters: Miss C. T. Bilton, to London, S.W., from Netley; Miss L. E. Mackay, to Cairo, from Alexandria; Miss D. M. Taylor to Alexandria, from Cairo; Miss E. M. Denne, to Wynberg, from Bloemfontein; Miss G. M. Allen, to Cambridge Hospital, Aldershot, from Chatham; Miss E. H. Hordley, to Cambridge Hospital, Aldershot, from Cosham; Miss E. M. Lang, to Devonport, from Tidworth; Miss H. A. Hare, to Tidworth, from Devonport; Miss G. S. Jacob, to Cosham, from Woolwich; Miss A. Barker, to Woolwich, from Cambridge Hospital, Aldershot. Staff Nurses: Miss J. H. Congleton, to Tidworth, from London, S.W.; Miss E. K. Kaberry, to Alexandria, from Cairo; Miss A. S. Siddons, to Netley from duty on T.S. "Plassy," Miss S. W. Wooler, to Colchester, from duty on T.S. "Plassy"; Miss E. G. Barrett, to London, S.W., from duty on T.S. "Plassy"; Miss A. S. Siddons to Edinburgh, from Netley.

Appointments Confirmed.—Staff Nurses: Miss J. A. M. Stewart, Miss H. C. Johnston.

ROYAL ARMY MEDICAL COLLEGE.

EXAMINATION FOR COMMISSION IN THE ROYAL ARMY MEDICAL CORPS.

Medicine.—Case for Commentary. Wednesday, January 26, 1910. Commencing 10 a.m. Time allowed—1½ hours. Read your instructions.

A married man, aged 42, an engineer by occupation, was seen in January, 1906.

Complaints.—Profound general weakness; inability to stand and walk; numbness in the feet and legs, and swelling of the feet.

History.—The patient, who had been a robust healthy man, had syphilis (primary and secondary) in the year 1891, and malaria in the years 1894 and 1896. His health subsequently was good till the present illness commenced without obvious cause.

In November, 1904, he began to feel weak and to lose colour; he became short of breath on exertion, and had occasional palpitation; these symptoms gradually increased. He placed himself under medical advice and has been under treatment since; does not know the nature of the medicine (pills and mixture) which he has been taking. For a time he improved; then gradually got worse, his skin became dark in colour, and he lost a good deal of weight. For the last two months he has felt numbness and "pins and needles" in the feet and legs; the legs have gradually become so weak that he is unable to stand and walk; the feet have become swollen.

A fortnight before the patient came under observation there was a severe epistaxis; a few hours later he vomited a considerable quantity of "coffee grounds."

Present State.—The surface of the body is well covered with fat, but the muscles are soft and flabby, and somewhat wasted. His weight is 9 st. 10 lb., and his height 5 ft. 7 in.; when in health he used to weigh 12 st. 4 lb. The temperature is 97·8°; the pulse 98, small and of low tension; the respirations, 20.

The lips and mucous membranes are markedly anæmic; the skin of the face and body is dark in colour and brownish in tint; the nipples and genital organs are deeply pigmented; the buccal mucous membrane is not pigmented. On the palms and soles there are a number of small, hard, projecting points.

The heart's impulse is feeble and felt with difficulty; the apex beat is situated in the fifth left interspace in the line of the nipple; a soft systolic murmur is audible in the mitral and pulmonary areas; the pulmonary second sound is louder than the aortic.

The blood examination shows red corpuscles 1,425,000 per cubic millimetre, hæmoglobin 32 per cent., white corpuscles 4,200 per cubic millimetre. The red corpuscles vary in size and shape; a few nucleated red corpuscles are present; 28 per cent. of the white corpuscles are lymphocytes.

The pupils and fundi oculi are normal.

The urine is normal.

The teeth are bad; the tongue is smooth and clean; the appetite poor. The patient has recently had some diarrhœa. He complains of occasional pain in the region of the stomach, and of nausea. Nothing abnormal can be detected on examination of the abdomen. There has been no pain in the back.

The patient is unable to stand or walk; the muscles of the legs are soft and much more atrophied than the other muscles of the body; there is well-marked foot drop; the muscles on the front of the legs show the reaction of degeneration. The knee-jerks and Achilles-jerks are absent; the plantar reflex is present, the toe movement being flexion; the bladder and rectum are unaffected.

The patient complains of numbness and "pins and needles" in the feet, legs, and hands; objective examination shows some anæsthesia and analgesia in these parts. On pinching the calves the patient complains of pain.

Diagnosis.—Discuss the diagnosis and differential diagnosis of—(1) the case generally; (2) the pigmentation of the skin; (3) the nervous symptoms, describing minutely the exact position and nature of the nervous lesion.

Prognosis.—Give your opinion and the reasons for it.

Treatment—What dietetic, medicinal, or other measures would you advise?

Surgery.—Case for Commentary. Wednesday, January 26, 1910. Commencing 11.30 a.m. (Time allowed—1½ hours.) Read your instructions.

A woman, aged about 65, was admitted to hospital with a swelling of the right buttock. She complained of severe lancinating pain down the thigh and leg.

On examination a rounded tumour the size of an orange was noticed on the buttock just below the sacro-sciatic foramen.

On palpation it was elastic and pulsatile.

On auscultation a loud systolic bruit was heard, but the bruit was not conducted along the ileo-femoral artery.

Vaginal examination revealed a swelling with characters similar to the above and apparently connected with it.

By firm pressure the tumour could be reduced in size. On removing the pressure it regained its former bulk fairly rapidly.

An operation was performed with the view of diminishing the pain, and possibly of effecting a cure.

Soon after the patient had been removed from the theatre it was obvious that the tumour was as large and as pulsatile as before the operation.

Pyrexia set in. There was extreme abdominal tenderness. Death occurred three days later.

Comment on the above case, directing your criticism chiefly to (1) the diagnosis of the malady; (2) the explanation of the failure of the operation; and (3) the cause of death.

Examination of Captains for Promotion to Major.

Hygiene (for Class). (Written.)—Monday, January 31, 1910. From 10 a.m. to 1 p.m.

(1) Discuss the question of the metabolism of proteids in the body. In what way is this affected by an increase in the amount of proteid and other food principles ingested?

(2) Under what conditions can a man, actually at his duty in barracks, be a disseminator of the *Bacillus typhosus* amongst his comrades? Classify such men and say which you consider the most dangerous.

(3) What do you understand by the terms "Disinfectant" and "Disinfection"? What are the relative advantages and disadvantages of (*a*) Hot air, (*b*) Saturated steam, and (*c*) Superheated steam as disinfecting agents for large bundles of bedding or clothing?

(4) You are desired to present a report on a certain stream as to its fitness or otherwise as a source of water for a military station. State how you would proceed and the nature of the evidence on which you would rely.

A sample having been forwarded to the District Laboratory the following report is returned:—

Total solids	60	pts. per 100,000
Volatile solids	30	,, ,,
Fixed solids	30	,, ,,
Chlorine	2·5	,, ,,
Free ammonia	0·004	,, ,,

Albuminoid ammonia	0·008 pts. per 100,000
Nitrites	*Nil.*
Nitrates	0·03 ,, ,,
Oxygen absorbed in two hours ..	0·12 ,, ,,
Hardness, total	30
Hardness, removable	19

Bacteriological.—Typical *B. coli* found in 10 c.c. of the water.

Microscopical.—Beyond ordinary water algæ and organisms, only vegetable *débris* and a few wool fibres are found.

How will the above report influence your decision, and why?

In the event of your decision being unfavourable and the stream being the only available source of supply, indicate the method you would adopt in order to render the water inocuous to the users.

Hygiene (for Class). (Practical.) Tuesday, February 1, 1910. From 10 a.m. to 1 p.m.

(1) Examine the sample before you and give an opinion as to its fitness or otherwise for issue to patients in hospital, giving reasons for your decision.

(2) Omitting the corrections for temperature and pressure, calculate the respiratory impurity in the air of the laboratory.

Pathology (for Class)—(Written). Monday, January 31, 1910. From 2.30 p.m. to 5.30 p.m. [N.B.—Four questions only to be answered].

(1) Describe the procedure by which you would endeavour to obtain the fullest diagnostic information in connection with the numbers and relative proportions of the leucocytes. What blood-picture would you expect to find in the following conditions:—

(*a*) Deep-seated suppuration? (*b*) Croupous pneumonia? (*c*) Kala-Azar?

(2) Discuss the ætiology of leprosy, with special reference to the distribution of the *Bacillus lepræ* in the tissues, and to the lesions produced in the course of the disease.

(3) Describe the phenomenon known as the "fixation of the complement" and its application in the diagnosis of syphilis.

(4) Discuss in general terms the part played by *Glossina palpalis* in sleeping sickness.

(5) Describe the *Microfilaria nocturna*. How is it supposed to bring about the various pathological changes with which it is associated?

Pathology (for Class). (Practical). Wednesday, February 2, 1910. From 10 a.m. to 1 p.m.

(1) Report upon the results of your examination of the bacterial culture marked with your number. Leave two stained films of the culture beside your microscope.

(2) Stain the film preparation with which you are provided, so as to demonstrate the presence of any protozoal organisms which it may contain. Describe in your paper what you have found, and leave your specimen in focus under your oil-immersion lens.

(3) Mount and stain the section of lung from a case of croupous pneumonia, with a view of demonstrating the pneumococci to the best advantage.

(4) Examine carefully the stained film provided, describe in your paper what you have seen, and give your opinion as to the nature of the specimen.

FREEMASONRY.

A Lodge has been formed in London, called the "In Arduis Fidelis" Lodge, No. 3,432, in connection with the Royal Army Medical Corps (of the London District more particularly). Membership is open to officers and N.C.O.'s above the rank of Corporal belonging to both past and present of the Regular Army and Territorial Force, and the medical branch of the Officers Training Corps of London University.

A meeting will be held at the Freemason's Hall, Great Queen Street, W.C. (off Aldwych), on the first Thursdays in each month, except the months of July, August, and September, time about 5 p.m.

The ceremony of consecration will take place at the same place on Thursday, March 3rd, 1910, at 4.30 p.m., to be followed by a banquet in the Connaught Rooms, adjoining.

The joining fee is £1 1s., and the annual subscription is, for town members £1 1s., and country members 10s. 6d.

The First Worshipful Master will be Captain Arthur R. Roch, F.R.C.S., R.A.M.C.T., 1st London Sanitary Company.

For further particulars apply to Captain Langford Lloyd, D.S.O., R.A.M.C., Adjutant, Royal Army Medical School of Instruction, 1st and 2nd London Division of the Territorials, 51, Calthorpe Street, Gray's Inn Road, W.C.

UNITED SERVICES MEDICAL SOCIETY.

THE next meeting of the above-named Society will be held at the Royal Army Medical College, Grosvenor Road, S.W., on Wednesday, March 9, 1910, at 8.30 p.m., when a paper will be read by Staff-Surgeon H. C. Adams, R.N., on "Treatment of Syphilis by Intramuscular Injection of Metallic Mercury. Notes on Mercurial Creams, &c."

ROYAL COLLEGE OF SURGEONS IN IRELAND.

THE Examination for the Fellowship is divided into two parts, viz., the Primary (Anatomy, Physiology, and Histology), and the Final (Surgery, Surgical Anatomy, and Pathology). The Examinations are held three times in each year in the months of March, July, and November. Examinations at any other time will not be granted under any circumstances.

BIRTH.

ANDREWS.—On December 16, 1909, at Curepipe, Mauritius, the wife of Lieutenant L. A. Andrews, R.A.M.C., of a son.

DEATHS.

MADDEN.—At Hastings, on January 5, 1910, Surgeon-Major-General Charles Dodgson Madden, C.B., K.H.S., retired, Army Medical Staff. He entered the Service on December 14, 1854, and served on the Staff in the Royal Artillery, 4th, 39th, and 44th Foot, and Army Medical Department. He became Surgeon on October 5, 1867; Surgeon-Major, August 15, 1868; Deputy Surgeon-General, June 28, 1876; Surgeon-General on May 7, 1882, and retired on retired pay on August 1, 1893. His war service was as follows: Crimean Campaign, 1855; Siege of Sevastopol. Medal with clasp and Turkish medal. Indian Mutiny, 1857-9, with Saugor Field Division. Medal. Abyssinian Expedition, 1867-8. Action of Arogee and capture of Magdala. Despatches, *London Gazette*, June 30, 1868. Medal; promoted Surgeon-Major. He was made Honorary Surgeon to the Queen in 1895, received the C.B. in 1896, and was in receipt of a Good Service Reward.

BORRADAILE.—At Clapham, on February 5, 1910, Major Alfred Latour Borradaile, M.B., retired, late R.A.M.C., aged 45. He entered the Service on July 27, 1887, became Major on July 27, 1899, and retired on retired pay on September 7, 1907. His war service was: Nile Expedition, 1898. Egyptian medal; medal.

WARRANT OFFICERS AND SERJEANTS' (PAST AND PRESENT) DINNER CLUB.

THE Committee met at the Serjeants' Mess, Millbank Barracks, London, S.W., on February 19, and appointed the following Sub-Committee to carry out the detailed arrangements for the second annual dinner:—

President: Serjeant-Major C. H. Smith. *Members:* Mr. A. Mallord, Staff-Serjeant W. Hicks.

The dinner will be held at the "Monico Restaurant," Regent Street, London, W., on April 6. Price of tickets, 4s. 6d. A musical programme will be arranged.

EXCHANGES, &c.

The charge for inserting Notices respecting Exchanges in the Royal Army Medical Corps is 5/- for not more than five lines, which should be forwarded by Cheque or P.O.O., with the notice, to Messrs. G. STREET and CO., Ltd., 8, Serle Street, London, W.C., not later than the 22nd of the month.

In the event of Reprints or "Excerpts" of articles being required by the authors, notification of such must be sent when submitting the papers. Reprints and Excerpts may be obtained at the following rates, and additional copies at proportionate rates :—

Number of Reprints	Number of Pages	Cost of Reprints	Cost of **EXCERPTS** *	Extra for Covers for Reprints: As Journal, Printed on Front	As Journal, Plain, Unprinted	Cheaper Paper, Printed on Front	Cheaper Paper, Plain, Unprinted
		£ s. d.	£ s. d.	s. d.	s. d.	s. d.	s. d.
12	4	0 2 6	0 1 0				
	8	0 4 6	0 2 0	3 6	0 11	3 2	0 7
	16	0 7 6	0 3 6				
25	4	0 3 0	0 1 3				
	8	0 5 6	0 2 6	4 0	1 3	3 6	0 9
	16	0 9 6	0 4 6				
50	4	0 4 0	0 1 8				
	8	0 6 9	0 3 2	5 0	1 9	4 0	1 0
	16	0 12 0	0 5 3				
100	4	0 5 6	0 2 9				
	8	0 9 0	0 4 4	6 6	3 3	5 6	2 0
	16	0 16 9	0 6 9				
200	4	0 8 6	0 4 0				
	8	0 13 6	0 6 0	9 0	6 3	7 6	4 0
	16	1 3 6	0 8 9				

* These are not arranged as Reprints, but appear precisely as in the Journal with any other matter that in the Journal may happen to appear on the first and last pages of the particular excerpt ordered.

Cases for Binding Volumes.—Strong and useful cases for binding can be obtained from the publishers at the undermentioned rates:—

Covers, 1s. 4d. net; binding, 1s. 2d.
These charges are exclusive of cost of postage.

In forwarding parts for binding the name and address of sender should be enclosed in parcel.

Notices.

EDITORIAL NOTICES.

The Editor will be glad to receive original communications upon professional subjects, travel, and personal experiences, &c. He will also be glad to receive items of news and information regarding matters of interest to the Corps from the various garrisons, districts, and commands at home and abroad.

All such Communications or Articles accepted and published in the "Journal of the Royal Army Medical Corps" will (unless the Author notified at the time of submission that he reserves the copyright of the Article to himself) become the property of the Library and Journal Committee, who will exercise full copyright powers concerning such Articles.

Matter intended for the Corps News should reach the Editor not later than the 15th of each month for the following month's issue. Notices of Births, Marriages, and Deaths are inserted free of charge to subscribers and members of the Corps. All these communications should be written upon one side of the paper only; they should by preference be type-written, but, if not, all proper names should be written in capital letters (or printed) to avoid mistakes, and be addressed The Editor, "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS," War Office, Whitehall, London, S.W.

Communications have been received from Brevet-Colonel R. H. Firth, Major W. S. Harrison, Lieutenant H. S. Rankin, Captain J. Dorgan, Lieutenant-Colonel C. Birt, Major C. E. Pollock, Captain J. Cowan, Serjeant E. B. Dewberry, Lieutenant W. J. Aviss, Major W. T. Mould, Lieutenant-Colonel J. B. Wilon, Lieutenant-Colonel E. M. Wilson (R), Major R. J. Blackham, Lieutenant J. H. Spencer, Major C. E. P. Fowler.

The following publications have been received:—

British: The Royal Engineers' Journal, The St. Thomas's Hospital Gazette, Journal of the Royal Sanitary Institute, The Indian Medical Gazette, The Australasian Medical Gazette, The Middlesex Hospital Journal, The Lancet, Journal of the United Service Institution of India, Army and Navy Gazette, The Practitioner, Proceedings of the Royal Society of Medicine, Medical Press and Circular, Red Cross and Ambulance News, The Medical Review, The Shield, The Hospital, Public Health, St. Bartholomew's Hospital, Guy's Hospital Gazette, The All-India Hospital Assistant Journal, Guy's Hospital Reports, Transactions of the Society of Tropical Medicine and Hygiene, Journal of the Royal United Service Institution.

Foreign: Annali di Medecina Navale e Coloniale, Revista de Sanidad Militar y La Medicina Militar Española, Bulletin de L'Institut Pasteur, Le Caducée, Japanese Journal, Boletin de Sanidad Militar, The Military Surgeon, Russian Journal, Militaertagen, Publication of the Massachusetts General Hospital, Bulletin of the Johns Hopkins Hospital, American Medicine, Archives de Médicine Navale.

MANAGER'S NOTICES.

The Journal of the Royal Army Medical Corps is published monthly, six months constituting one volume, a volume commencing on 1st July and 1st January of each year.

The Annual Subscription is £1 (which includes postage), and should commence either on 1st July or 1st January; but if a subscriber wishes to commence at any other month he may do so by paying for the odd months between 1st July and 1st January at the rate of 1s. 8d. (one shilling and eightpence) per copy. (All subscriptions are payable in advance.)

Single copies can be obtained at the rate of 2s. per copy.

The Corps News is also issued separately from the Journal, and can be subscribed for at the rate of 2s. (two shillings) per annum, including postage. Subscriptions should commence from 1st July each year; but if intending subscribers wish to commence from any other month, they may do so by paying for the odd months at the rate of 2d. per copy. (All subscriptions are payable in advance.)

Officers of the Royal Army Medical Corps possessing Diplomas in Public Health, &c., are kindly requested to register their special qualifications at Headquarters. Letters of complaint are frequently received from officers stating that their special qualifications have not been shown in the Distribution List which is published as a supplement to the Journal in January and July of each year. As, however, the particulars of this list are supplied from official sources, officers are reminded that unless the possession of Diplomas, &c., has been registered at Headquarters, no entry of such qualifications can be recorded in the Distribution List.

Letters regarding non-delivery of the Journal, or change of address, should be sent to the Hon. Manager, "Journal of the Royal Army Medical Corps," War Office, Whitehall, London, S.W., and reach there not later than the 20th of each month.

It is requested that all Cheques or Postal Orders for Subscriptions to the Journal, Corps News, Reprints, &c., be crossed "Holt & Co.," and made payable to the "Hon. Manager, Journal R.A.M.C.," and not to any individual personally.

All communications for the Hon. Manager regarding subscriptions, &c., should be addressed to

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"Journal of the Royal Army Medical Corps,"
War Office, Whitehall, S.W.

JOURNAL

OF THE

ROYAL ARMY MEDICAL CORPS.

Corps News.

April, 1910.

ROYAL ARMY MEDICAL CORPS.

School of Instruction, Lieutenant-Colonel Arthur R. Aldridge, M.B., Royal Army Medical Corps, to be an Instructor, *vice* Brevet-Colonel R. H. Firth, whose tenure of that appointment has expired, dated February 28, 1910.

ARMY MEDICAL SERVICE.

Surgeon-General Sir Alfred Keogh, K.C.B., M.D., is placed on retired pay, dated March 6, 1910.

He entered the service on March 6, 1880; became Surgeon-Major on March 6, 1892, and Lieutenant-Colonel March 6, 1900; he was promoted Lieutenant-Colonel with increased pay for services in South Africa, November 29, 1900; promoted Colonel, December 2, 1904, and Surgeon-General, December 3, 1904. He was appointed Deputy Director-General (with temporary rank of Surgeon-General), January 1, 1902, and Director-General, January 1, 1905, and retired on retired pay on March 6, 1910.

His war service is: South African War, 1899-1901. In charge of a General Hospital. Operations in the Cape Colony, South of Orange River, 1899-1900; operations in the Orange Free State, March to May, 1900; operations in Orange River Colony, May to June, 1900; operations in the Transvaal, June to November 29, 1900; operations in the Transvaal, November 30, 1900, to February, 1901. Despatches, *London Gazette*, April 16, 1901. Lieutenant-Colonel under Article 362, Royal Warrant. Queen's Medal with four clasps. C.B.

He received the K.C.B. in 1906, and was appointed Honorary Physician to the King in 1907.

Surgeon-General William L. Gubbins, C.B., M.V.O., M.B., Honorary Surgeon to the King, from Deputy-Director-General to be Director-General, and to rank as Lieutenant-General, *vice* Surgeon-General Sir A. Keogh, K.C.B., M.D., dated March 6, 1910.

Colonel William Babtie, V.C., C.M.G., M.B , from Inspector of Medical Services to be Deputy-Director-General, and is granted the temporary rank of Surgeon-General while so employed, *vice* Surgeon-General W. L. Gubbins, C.B., M.V.O., M.B., dated March 6, 1910.

Lieutenant-Colonel W. G. Macpherson, C.M.G., M.B., from the Royal Army Medical Corps, to be Colonel, *vice* W. Babtie, V.C., C.M.G., M.B., dated March 6, 1910.

ROYAL ARMY MEDICAL CORPS.

The undermentioned Lieutenants to be Captains, dated January 30, 1910: Gerald H. Stevenson, M.B.; John H. Spencer, M.B.; William H. Forsyth, M.B.; Archibald C. Amy, M.B.; Alfred H. Heslop, M.B.; Wright Mitchell, M.B.; James A. B. Sim, M.B.; Edward J. Elliot, M.B.; Edward Gibbon, M.B.; Robert W. D. Leslie; Ernest B. Lathbury; Cecil Scaife, M.D.; Daniel M. Corbett, M.B.; Michael J. Lochrin; Ernest D. Caddell, M.B.; Benjamin Johnson; William E. C. Lunn, M.B.; John R. Foster; William W. Boyce; Duncan Coutts, M.B.: Arthur M. Benett; George P. A. Bracken; James A. Bennett, M.B.; Whiteford J. E. Bell, M.B.; Charles W. Bowle;

Hector L. Howell; William F. M. Loughnan; Thomas W. Browne; William I. Thompson, M.B.; Carlisle Kelly, M.B.; Dennis T. MacCarthy, M.B.; Ernest C. Phelan, M.B.; John J. O'Keefe, M.B.; Edward J. Kavanagh, M.B.; Arthur H. Jacob.

Supernumerary Lieutenant Charles T. V. Benson, from the Seconded List, is restored to the Establishment, dated January 30, 1910.

The undermentioned to be Lieutenants (on probation), dated January 28, 1910: John Gilmour, M.B.; William Warwick Treves, M.B.; John Thomas Simson, M.B.; Campbell Robb, M.B.; Eric Thomas Gaunt, M.B.

Lieutenant (on probation) John T. Simson, M.B., is seconded under the provisions of Article 300, Royal Warrant for Pay and Promotion, 1909, dated January 28, 1910.

Lieutenant Thomas T. H. Robinson, M.B., to be Captain, dated October 4, 1909.

Captain John B. Cautley retires, receiving a gratuity, dated March 2, 1910.

Lieutenant Stephen Field, from the Seconded List, is restored to the Establishment, dated February 11, 1910.

Lieutenant Malcolm Leckie is seconded for service with the Egyptian Army, dated February 11, 1910.

Captain Walter B. Fry is seconded for service with the Egyptian Army, dated February 21, 1910.

The undermentioned Quartermaster and Honorary Lieutenant is granted the honorary rank of Captain, dated March 7, 1910: John B. Conolly, Royal Army Medical Corps.

INCREASED PAY.—Lieutenant-Colonel M. O'D. Braddell has been selected for increased pay under Article 317 Royal Warrant from March 6, 1910, inclusive, *vice* W. G. Macpherson, promoted.

ARRIVALS HOME FOR DUTY.—From India: Lieutenant-Colonels W. T. Swan, H. Cocks, F. W. G. Gordon Hall, and H. P. G. Elkington. Majors T. W. Gibbard, J. B. Anderson, and J. Grech. Captains S. O. Hall, A. J. Hull, D. P. Watson, R. T. Collins, J. Fairbairn, J. H. Douglass, and M. Sinclair. From West Coast of Africa: Captains A. F. Carlyon and W. Riach.

Colonel Sir D. Bruce, C.B., F.R.S., has returned to this country on completion of duty on the Sleeping Sickness Commission.

TRANSFERS TO HOME ESTABLISHMENT. — Majors H. J. Parry D.S.O. and C. H. Hopkins.

TRANSFERS.—Lieutenant-Colonel C. L. Josling from the London District to Western Command. Lieutenant-Colonel R. W. Wright, from the Royal Arsenal to Eastern Command. Major T. B. Beach, from the Royal Arsenal to Aldershot Command. Lieutenant J. C. L. Hingston, from the Scottish Command to the Southern Command.

EMBARKATIONS.—For India: Brevet-Colonel R. H. Firth, Major E. M. Williams, Captains W. Bennett and G. F. Sheehan, Lieutenants J. E. Ellcome, R. M. Dickson, F. H. Bradley, and A. L. Stevenson. For Egypt: Captain W. B. Fry and Lieutenant M. Leckie. For the West Coast of Africa: Lieutenant-Colonel A. A. Sutton, D.S.O., Captains J. W. Leake, A. L. A. Webb, G. Baillie, and H. B. Connell; Lieutenant G. H. Stack.

POSTINGS.—To Scottish Command: Lieutenant-Colonel F. W. G. Gordon-Hall and Captain J. Fairbairn. To Western Command: Lieutenant-Colonel H. Cocks, Major J. Grech, and Captain D. P. Watson. To Aldershot Command: Major K. M. Cameron. To Eastern Command: Lieutenant-Colonel G. Wilson, Captains A. J. Hull, F. M. M. Ommanney, R. T. Collins and A. C. Osburn. To Southern Command: Lieutenant-Colonels H. A. Haines, W. T. Swan, and Major H. J. Parry, D.S.O. To London District: Majors T. W. Gibbard and J. B. Anderson. To Irish Command: Lieutenant-Colonel H. P. G. Elkington, Captains S. O. Hall, J. H. Douglass, and M. Sinclair; Lieutenant F. Worthington.

APPOINTMENTS.—Lieutenant-Colonel G. Wilson in charge of Military Hospital, Dover; Lieutenant-Colonel W. T. Swan, in charge of Medical Division, Royal Victoria Hospital, Netley; Major T. W. Gibbard, in charge of Military Hospital, Rochester Row, London; Major J. B. Anderson, Recruiting Medical Officer London District; Major K. M. Cameron, Specialist in Operative Surgery, Aldershot; Captain S. O. Hall, in charge of Military Families Hospital, Fermoy: Captain T. E. Fielding,

Adjutant, Royal Army Medical Corps School of Instruction, Territorial Force, London District.

Major G. E. F. Stammers' appointment as a Sanitary Officer in the Southern Command has been extended for six months.

The King has been graciously pleased to sanction the following appointments to the Order of the Hospital of St. John of Jerusalem in England as Knights of Grace:—

Lieutenant-Colonel Frederick Henry Appleby, M.R.C.S. (from Honorary Associate). Major Robert James Blackham, R.A.M.C. (from Honorary Asssociate).

Sir Alfred Keogh, K.C.B., has been appointed Rector of the Imperial College of Science and Technology.

RESULTS OF EXAMINATION OF MAJORS AND LIEUTENANTS, ROYAL ARMY MEDICAL CORPS.

The following results of examinations are notified for general information:—

Passed in Military Law for the rank of Lieutenant-Colonel: Majors F. A. Symons, M.B. (97 per cent); H. V. Prynne (91 per cent.).

Passed in technical subjects for the rank of Lieutenant-Colonel: Major W. E. Hardy.

Passed in A. M. O: H. C. French; S. and E.: B. Forde, M.B.; *Med. His.:* H. C. French.

Passed in (*h*) *i* for the rank of Captain; R. D. O'Connor.

Passed in (*h*) *ii* and *iii* for the rank of Captain: L. A. A. Andrews; W. R. O'Farrell.

Passed in (*d*) *ii* for the rank of Captain: H. M. J. Perry; L. A. A. Andrews (75 per cent.); W. R. O'Farrell; F. Worthington, M.B.; W. H. S. Burney.

(*h*) *ii*.—S. Field; W. H. S. Burney.

(*h*) *iii*.—W. J. E. Bell, M.B.; F. Worthington, M.B.

MEMORANDUM.

The undermentioned officers will probably be required to proceed abroad during the coming trooping season. Information as to destination and dates of embarkation will be published as soon as possible:—

Lieutenant-Colonels W. L. Reade; J. M. Irwin; T. W. O'H. Hamilton, C.M.G.; R. R. H. Moore; G. W. Brazier-Creagh, C.M.G.; C. Birt; J. B. W. Buchanan; R. W. Wright. Majors E. G. Browne; T. B. Beach; W. W. O. Beveridge, D.S.O.; G. A. T. Bray; C. E. G. Stalkartt; H. J. M. Buist, D.S.O.; G. B. Stanistreet; F. J. Wade-Brown; H. S. Thurston; G. A. Moore; J. H. Rivers; C. G. Spencer; S. J. C. P. Perry; G. E. F. Stammers; H. G. F. Stallard; F. S. Penny; H. P. W. Barrow. Captains A. E. Thorp; H. B. G. Walton; W. B. Winkfield; F. Ashe; V. J. Crawford; W. M. McLoughlin; J. A. Hartigan; J. C. Foster; J. Dorgan; C. H. Furnival; A. C. Adderley; P. H. Henderson; A. D. Jameson; C. R. L. Ronayne; R. L. Popham; H. F. Shea; C. E. Fleming; J. T. Johnson; A. C. Duffey; R. N. Hunt: H. E. J. A. Howley; J. W. West; R. N. Woodley; E. G. Ffrench; F. W. Lambelle; T. J. Potter; A. W. Irwin; S. M. Adye-Curran; G. F. Rugg; G. S. C. Hayes. Lieutenants S. Field; J. C. L. Hingston; B. A. Odlum; J. James; A. C. H. Suhr; F. Worthington; D. S. Buist; A. M. Pollard; G. C. Collet; C. Clarke; E. V. Vaughan; A. N. R. McNeill; A. R. Wright; T. B. Nicholls; J. B. Jones; J. A. Clark; S. McK. Saunders; T. J. Mitchell; F. H. Somers-Gardner; D. H. C. MacArthur; D. E. C. Pottinger; G. S. Parkinson; R. Gall; C. H. O'Rorke; A. W. Byrne; J. Startin; C. G. Sherlock; H. H. Leeson; S. W. Kyle; H. Bevis; J. W. Lane; W. C. Wright; A. T. J. McCreery. Quartermaster Hon. Captain F. M. Hall.

PROMOTIONS.

To be Serjeant Major.—9763 Quartermaster-Serjeant E, J. Tilbury, March 3, 1910, *vice* E. C. Bowen to pension.

To be Lance-Corporals.—Special under Para. 281, S.O. R.A.M.C.: 19223 Private J. H. Stafford, February 22, 1910; 19555 Private P. C. Martin, February 22, 1910; 874 Private F. A. Johnson, February 25, 1910.

DISCHARGES.—8299 Serjeant-Major E. C. Bowen, March 2, 1910, to pension; 7690 Staff-Serjeant W. H. Pleass, January 18, 1910, after three months' notice; 8187 Staff-Serjeant A, P. Paddick, March 16, 1910, medically unfit; 8351 Serjeant R. E. Watson, March 4, 1910, termination of second period; 8363 Serjeant W. H. Gent, March 8, 1910, termination of second period; 4337 Private W. Walker, February 15, 1910, free under Royal Warrant; 8346 Private W. J. Thurling, February 25, 1910, termination of second

period; 2100 Private F. Flay, February 28, 1910, medically unfit; 11170 Private W. Jordan, February 16, 1910, free after thirteen years' service; 11094 Private C. Crew, February 11, 1910, free after eighteen years' service; 4732 Private J. T. Flanaghan, February 26, 1910, free under Royal Warrant; 4891 Private G. L. Hobson, March 1, 1910, on payment of £10; 15597 Private S. J. Calver, March 15, 1910, termination of second period; 1568 Private V. G. Fay, March 15, 1910, medically unfit; 17758 Private J. Horler, March 18, 1910, medically unfit.

Transfers to Army Reserve.—17223 Private H. White, February 9, 1910; 18248 Private G. Barrett, February 18, 1910; 17258 Private F. W. Pearce, February 16, 1910; 19554 Private E. Perkins, February 17, 1910; 17312 Private C. Lichfield, February 21, 1910; 17263 Corporal R. G. Thixton, February 19, 1910; 17259 Private T. Waters, February 16, 1910; 17274 Private J. A. Hubling, February 24, 1910; 493 Private T. Haworth, February 24, 1910; 17277 Private R. M. Knowles, February 24, 1910; 17307 Private H. Beardsworth, February 26, 1910; 17317 Lance-Corporal J. C. Reynolds, February 25, 1910; 17357 Private F. E. Wyles, February 26, 1910; 1085 Private E. N. Thorne, February 1, 1910; 17303 Corporal A. Auchterlonie, February 24, 1910; 17318 Private J. Hodgson, February 27, 1910; 17388 Lance-Corporal J. C. Church, March 7, 1910; 17374 Private G. A. Robinson, March 7, 1910; 1086 Private H. Gilliam, March 4, 1910; 1088 Private A. Owen, March 7, 1910; 4354 Private A. H. Bowman, March 13, 1910; 17376 Private F. Heenan, March 7, 1910; 17396 Corporal E. Bairstowe, March 11, 1910.

Transfers from other Corps.—4877 Private W. W. Bardwell, February 11, 1910, from R. Berkshire Regiment.

Transfers to other Corps.—13856 Serjeant R. J. McKay, February 9, 1910, to Northern Nigeria; 8714 Serjeant A. G. Walsh, February 25, 1910, to Territorial Forces; 11029 Serjeant A. Spowage, February 28, 1910, to Territorial Forces; 4386 Private R. Ross, February 16, 1910, to Cameron Highlanders; 2283 Private T. Hay, February 17, 1910, to A. and S. Highlanders; 4744 Private A. V. Innes, March 7, 1910, to A.S. Corps; 4704 Private H. Steeples, March 5, 1910, to K.O.Y.L.I.

Embarkations for Abroad.

To Sierra Leone, per ss. "Bakana," February 12, 1910: 12104 Serjeant J. E. Newton, 16440 Serjeant R. Kildea, 14924 Corporal G. J. A. Forbes, 18648 Private J. B. Haley, 18873 Private W. J. Spiers, 1936 Private T. F. Cartwright.

Disembarkations from Abroad.

From Bermuda, per ss. "Magdalena," January 26, 1910: 8994 Quartermaster-Serjeant C. Kingston, 11613 Serjeant G. R. Morris, 16325 Corporal A. F. Gibbs, 17937 Corporal P. A. Kirby, 17825 Lance-Corporal N. Moore, 9042 Private T. R. Coombs, 4781 Private W. J. Gilbert, 1675 Private P. Horrigan, 17087 Private A. G. Jones, 18000 Private J. Payne.

From Hong Kong, per H.T. "Soudan," January 27, 1910: 19924 Lance-Corporal E. D. Barr.

From Tientsin, per H.T. "Soudan," January 27, 1910: 17759 Serjeant J. Black, 18312 Private J. Howitt.

From South Africa, per H.T. "Soudan," January 27, 1910: 12896 Private E. Blennerhassett, 18991 Private S. Crowder, 18139 Private A. Leech, 19758 Private W. Manners.

From Gibraltar, per H.T. "Soudan," January 27, 1910: 18477 Private P. Leary, 1393 Private A. Vear.

From Gibraltar, per ss. "Mooltan," February 26, 1910: 10336 Corporal F. J. Howell.

From Sierra Leone, per ss. "Nigeria," March 7, 1910: 11424 Corporal E. Weavis, 9519 Private R. P. Partridge.

The following N.C.O.'s and Men have qualified for Promotion in the Various Corps Examinations:—

For Staff-Serjeant.—18307 Serjeant F. H. Barker, 18863 Serjeant J. Mulcahy, 9742 Serjeant E. Heath, 17381 Serjeant A. Gray.

For Serjeant.—9953 Serjeant E. J. Lovegrove, 12154 Corporal L. A. Powell, 15610 Corporal T. H. Griggs, 11788 Corporal D. Macdonald, 9299 Serjeant A. Jackson, 12395 Corporal E. J. Gibson.

For Corporal.—19747 Private C. H. Hyde, 95 Private A. G. W. Thomas, 113 Private J. D. Powell, 18724 Private W. Hill, 11437 Private J. W. Deasley, 10464 Private A. Morgan, 12357 Private H. W. Griffin, 18229 Private J. Turbyne, 18040 Private W. Toothill, 276 Private T. D. Baldwin, 1065 Private A. Dean, 1865 Private E. B. Browne, 1919 Private F. H. Vyse, 19608 Private C. W. McPhail, 19817 Private V. S. Painter.

Qualified as Dispensers.—14620 Corporal S. Gowers, 19007 Private J. R. Dare, 19555 Private P. C. Martin, 17987 Corporal A. Betts, 11577 Corporal D. Russell, 17628 Lance-Corporal T. Luscombe, 19223 Private J. H. Stafford, 12382 Corporal J. H. Kay, 10076 Corporal W. H. Brown, 13032 Corporal T. Kerr, 18982, Private A. Newman, 18739 Private R. C. Bradford, 11015 Corporal W. E. Phillips, 16002 Corporal H. W. Amsden, 148 Private T. H. Allbeury, 12756 Corporal F. H. Jones, 16289 Corporal C. G. Hearn, 18443 Private G. Harris, 18737 Private W. T. Stovold, 874 Private F. A. Johnson.

NOTES FROM LONDON.—A farewell dinner was given at the Carlton Hotel on Tuesday, March 1, to Sir Alfred and Lady Keogh, Miss Keer, and Lieutenant-Colonel W. G. Macpherson by the officers serving at the War Office. Twelve officers and eight ladies were present.

Royal Army Medical Corps Mess, London.

Farewell Dinner to Sir Alfred Keogh.

On March 3 a farewell dinner to Sir Alfred Keogh was given by the members of the Royal Army Medical Corps Mess, London. There were 108 officers present and the following guests: Sir Edward Ward, Sir Frederick Treves, and Mr. A. Bowlby. During dinner a programme of music was performed by the Corps band, under the direction of Mr. G. P. Robertson, Bandmaster, R.A.M.C.

At the conclusion of the dinner, after the health of "The King" had been drunk, Surgeon-General Gubbins proposed the toast of the evening, and said:

"Colonel Wardrop and Gentlemen.—We are assembled to-night under what, I think, must be considered altogether exceptional circumstances. It is to show our respect, and I may add our affection, for our Director General who is about to retire on completion of thirty years arduous service in the Army. For the last ten years, especially, he has led the 'strenuous life' to an extent that would have satisfied even that glutton for work, ex-President Roosevelt, who, as well as I remember, wrote a brochure bearing that title. Sir A. Keogh comes, as no doubt many of you are aware, from a legal family. I can remember well an uncle of his, the late Mr. Justice Keogh, who was remarkable not only for his great judicial ability, but also for his fearless administration of the law, and I can recall, as if it were only yesterday, an occasion on which he presided over a celebrated trial for criminal conspiracy in the South of Ireland, and when I had the pleasure of listening to his charge to the Grand Jury, which, for clearness of thought, logical deduction and lucidity of expression, was a model of what such discourses should be. Now, gentlemen, I have laid stress on these three characteristics of the Judge's charge as they have been reproduced in an eminent degree in his distinguished nephew, as any of you who have been privileged to hear his speeches or read his memoranda on various subjects can testify. Sir Alfred Keogh was originally intended for the legal profession; fortunately for us, and perhaps for himself, he altered his mind, and decided to prepare for the Medical Service of the Army, but there were stormy times ahead. During the Whig Ministry of 1868 to 1874—that golden age of Liberalism, as it has been so justly styled—three enactments were passed directly affecting the Army—namely, the abolition of purchase, the institution of short service, and the unification of the Army Medical Department. Well, I do not suppose that there are a dozen men—at all events a dozen thinking men—in the Army to-day who would desire to see any of these measures reversed, but the present generation can have no conception of the bitter hostility which was thereby evoked in every mess and club throughout the Empire; nothing was heard but hostile criticism and abuse, some of the choicest expletives being reserved for the dislocated Medical Service. Matters seemed to go from bad to worse, candidates presented themselves in ever decreasing numbers for appointments that were offered, and at last a time arrived in the late seventies when only one individual presented himself, and he was currently reported to be insane. I have invited attention to the state of affairs which at that time existed, in order to draw a comparison between then and now. In the period I refer to, there were from a dozen to twenty candidates for fifty places; to-day the position is entirely reversed, and this improved condition of affairs is entirely due, I have no hesitation in saying, to the wise and statesmanlike policy initiated by Mr. Brodrick in 1901, and which our Director-General has done so much to cherish and develop. To hark back to 1879; a committee was formed under Sir Ralph Thompson to inquire into the grievances, and a fairly satisfactory warrant was produced. Seventy commissions were offered, for which there were a large number of candidates, and Mr. Keogh, as he then was, took second place in the competition, being a very few marks below the first man—*proxime accessit*, as they say in the schools.

"During the next few years he was stationed in various parts of the Empire, and

the first time his name came specifically to my notice was on an occasion when I was discussing higher appointments in the field with a senior officer. It was at the time of the Pendjeh affair, when we were on the brink of war with Russia. He remarked, 'If I should get a division, the man I intend to have as my staff officer is Alfred Keogh; he is very young and very junior, but nevertheless he is the man for me.' I was rather curious to meet this promising officer, and before long my desire was gratified. I was sent to take charge of the Station Hospital at Dinapore, and there I found our friend doing duty. After a very pleasant year spent together we parted; I went north, he returned to England, and for several years did duty at the Royal Arsenal, Woolwich, and at Chatham, and this is a circumstance I would like to mention for the benefit of the many junior officers here to-night. When stationed at these places he took every opportunity of running up to London, not on pleasure bent, but with the object of improving his operative and ophthalmic surgery; and to prove that his right hand has not lost its cunning, I may mention an incident that occurred as recently as last October. He was returning from the United States in one of the large ocean liners when a passenger was seized with a dangerous illness; Sir A. Keogh was asked for his opinion, and he at once saw that the man would be dead in a few hours unless an operation was performed. On being asked to undertake the operation he consented; improvised arrangements had to be made, the ship was rolling heavily; nevertheless, he performed a most delicate abdominal operation with entire success, and with the result that the patient was landed at Liverpool on the high road to recovery; under Providence he undoubtedly owed his life to the skill of our Director-General. His great chance, however, came during the South African War, where he commenced as second in command of a general hospital, and eventually succeeded to the charge of another unit of the same kind at Springfontein, where I had an opportunity, when paying a flying visit, of judging of his powers of organization.

"When I was ordered up to Pretoria in July, 1900, to take over the duties of Principal Medical Officer of the Northern Districts, great difficulties were experienced, not only by the medical, but by every other branch of the Service, as my friend on my left (Sir Edward Ward) can testify. It formed a base for a force of from 60,000 to 80,000 men operating in every direction; new situations were daily arising, and I at once came to the conclusion that the sheet anchor, as far as we were concerned, would be an Army General Hospital in competent hands. A vacancy occurring at that particular time, I was asked to nominate an officer to take charge; I immediately suggested Lieut-Colonel Keogh, but my Chief demurred at first, on the ground of there being more senior officers available: however, I held out and he eventually gave way, subsequently stating that I could not have made a better selection. Colonel Keogh set to with a will and did really splendid work; the hospital was raised to over a 1,000 beds and organised in the most perfect manner. I might add that the medical members of the Romer Commission (at that time taking evidence at Pretoria) when going round, expressed astonishment at the comfort afforded the patients, and the completeness of the arrangements, making the remark 'that they could not be better cared for in the best of the Metropolitan Hospitals.' After a time Colonel Keogh contracted a severe attack of enteric fever aggravated by his untiring efforts in the interests of the sick.

"Well, gentlemen, we all at some period of our lives have our share of misfortunes, and we are wont to be comforted by our friends and relatives saying that these are intended for our benefit—in fact, that a little chastening is good for us. Some of us may be rather sceptical on this point, but here at all events was an instance in which out of evil came good. Fortunately for himself, and, I may add, indirectly for us, he was—much against his will—invalided to England, where his convalescence was slow. About that time Mr. Brodrick formed his committee of reorganisation, and so determined was he to have independent and unbiassed opinion, that the members were selected from outside the Army Medical Service. There was one man, however, as matters progressed, who it was felt would considerably strengthen the Committee, and that was Colonel Keogh. He accordingly joined it, worked hard, fought the battle in our best interests on every possible occasion, and when the time came to give effect to its recommendations he was selected for the appointment of Deputy-Director-General, which presently fell vacant. He subsequently—after ably filling it for three years—was appointed to the Chair, and with what conspicuous ability he has held that somewhat thorny post is well known to you all. I will not now dwell on the numerous reforms and measures of importance carried through by Sir Alfred Keogh during his term of office; these have already been ably dealt with by Sir William Taylor in his eloquent speech at the Corps Dinner in June last. Since that time, however, he has taken an active part in two other measures outside his own immediate

province; one was as a member of the Committee on the re-organisation of the Naval Medical Service which involved long and late hours; for his services in connection therewith he has received the thanks of the Lords of the Admiralty. The other was his attendance at the Congress of Surgeons of the United States, held at Washington last October, when he and the Director-General of the Navy worthily represented their respective branches of the Forces of the Crown; international courtesies such as these tend, even in a small way, to foster those amicable relations with the great Republic, which it is not only our interest, but our desire to maintain. An eminent French statesman has laid it down as a maxim that no individual can rightly be judged until fifty years after his death, when all passions and controversies will have subsided. I must confess I have no desire to bury our guest prematurely—even for the purpose of assessing his character correctly—but happily in this instance there are no passions or controversies to allay; he has made many many friends, and, as far as I am aware, not a single enemy. With your permission, then, I will anticipate the judgment of posterity and pronounce him to be one of the ablest and most successful administrators the Army has ever possessed, whilst his tact, diplomacy, and above all, his intense loyalty and devotion to the interests of his own service could not be surpassed. Gentlemen, I will now call on you to charge your glasses and drink with one accord, long life, health and prosperity to our Director-General, Sir Alfred Keogh."

The toast was received with acclamation, and drunk with musical honours.

Sir Alfred Keogh, who was visibly affected by the warmth of his reception, replied:—

"BROTHER OFFICERS AND GENTLEMEN, — I feel deeply the very warm reception which has been given to the toast so kindly and so eloquently proposed by Surgeon-General Gubbins. I cannot express in words the deep regret I feel at leaving the Corps in which I have spent thirty years. The Corps has always been my great object in life. I have lived only for it, worked my utmost to advance its interests—I might almost say I have dreamt of it. I have always felt a great pride in the Corps, and in the early days of my career it was a great grief to me that its officers and men were so little appreciated. I had studied its history and was conscious of the great work it had already accomplished for the Army and felt sure that if it were only given a real chance its work in the future would far surpass that of the past. After the South African War, when the chance came, I was fortunate enough to be at home, and became a member of the Re-organisation Committee. As a matter of Corps history, I must explain now that the Re-organisation Scheme of 1901 was not devised by me. The original scheme contained proposals with which I could not agree, but as the only representative of the Corps on the Re-organisation Committee, I am bound to acknowledge that my views were received with the utmost kindness, and I was met in every possible way. This should now be known lest the relation of others to the scheme should be forgotten. It is right, too, that you should know to whom, after the Secretary of State for War, the Corps is indebted for the means of attaining efficiency. In those early days when we were endeavouring to march forward, when adverse criticism of unthinking people was powerful for harm, when those of us who were earnest in fulfilling the demands made by the advanced officers of the Corps had much reason for anxiety, the one official who never faltered, who never hesitated to help us, was Sir Edward Ward. To him, gentlemen, you owe a debt of gratitude, and I desire to acknowledge that debt here and now, and in his presence. To me he was ever the encouraging friend, for he had the same confidence as I had in the capacity of the officers of the Corps, and recognised as freely as I did that its potential energy could be made actual. The problem was the application of science to methods of government. Sir Edward Ward was a layman. You owe him, therefore, all the more, in that he so early recognised the true relation of the Medical Corps to the Army. The consideration of this aspect of reform brings me to a point where I must not forget another name, one familiar to all of you, to whom in the many difficulties which surrounded me during the early days of my administration I, and therefore you, owe so much. I mean Sir Frederick Treves. The principles which I have mentioned were grasped by him even more precisely because of his professional knowledge. He has ever been your constant and devoted friend.

"Proud as I am of the work you have accomplished, I hope I have maintained, and remained loyal to, the principles which were then established. If you think so I am satisfied. I have been encouraged throughout my difficult task by the knowledge that I had your support, and that the adverse critics represented nothing and nobody. They have received their answer in the work you have already accomplished, and which

I regard as an earnest of the far greater things you will achieve in the future. It only remains for me to thank you for your support and for your confidence, to thank my own staff at headquarters, and Colonel Wardrop and the officers of this College for the enormous help they have been to me throughout my administration."

Sir Edward Ward, who was most warmly received, spoke as follows:—

"GENTLEMEN,—When I arrived here this evening I did not expect to be called upon to make a speech, and I hasten to allay your fears by assuring you that I do not intend to make one now. I am, however, very glad to be able, on behalf of my colleagues at the War Office, to express the very deep regret with which we all, from the Secretary of State downwards, regard the departure of Sir Alfred. I, personally, have been very closely connected with him, both in official duties and also by the ties of very sincere friendship, and I shall miss him very greatly indeed.

"Sir Alfred has referred very kindly to the work which I have been privileged to do in connection with the re-organisation of the Royal Army Medical Corps, but I fear that his account of it was much influenced by the great friendship which exists between us, and therefore must be accepted by you with considerable reservation. The credit for that great re-organisation belongs to Lord Midleton, then Mr. Brodrick, who in a most statesmanlike manner grasped the imperfections of the old system and determined that they should be swept away. He did me the honour of making me Vice-Chairman of the Re-organisation Committee, and any work I was able to do in that capacity was a labour of love, because I was deeply interested in the future success of a Corps which is of such enormous importance to the Army, and in which I had so many personal friends. When the Committee met, Lord Midleton and I found that our duties were lighter than we had anticipated, for we had as fellow-workers not only Sir Alfred Keogh but also Sir Frederick Treves and other leaders of the civil medical profession. The man, however, to whom we all turned when in doubt on any point was Sir Alfred Keogh; his great knowledge of his profession with all its many details and of the Army generally were invaluable.

"Gentlemen, I may also say to you who know so well how much you owe to him that no Corps ever had a better champion. He watched over your interests with unceasing care and never allowed the Committee to proceed with any proposal which he felt would interfere in any way with the future success of the great Corps which he loved so well. When our labours were over, Mr. Brodrick selected him to be your Deputy-Director-General and Director-General-designate, thus setting the final coping stone to the edifice which he had built up. Sir Alfred has re-organised your own Corps, he has organised the Medical Service of the Territorial Force, and the Voluntary Aid Detachments can testify that even Civilian Medical Institutions have not escaped his reforming hands.

"Gentlemen, when I arose at the request of my old friend General Gubbins, I comforted you by saying that I would not make a speech, and I do not intend now to break that promise. If I had desired to do so, I am restrained by the thought that any effort of mine would be a failure, preceded as I have been by your Chairman and by the honoured guest of the evening, both of whom come from an island where eloquence is one of the natural products of the soil. Far be it from a taciturn Scot like myself to enter into such a competition. I will, therefore, no longer persist, but will only thank Sir Alfred Keogh most sincerely on behalf of all his old War Office colleagues for the help which he has given to us on so many occasions in our various duties, and assure him once again how much we regret his departure and wish him the best of luck and the very best of times in such well-earned leisure as he may allow himself."

NOTES FROM YORK.—Surgeon-General W. W. Kenny, late Principal Medical Officer South African Command and the Officers, R.A.M.C., who served in South Africa between the years 1905 and 1908, recently presented Surgeon-General W. Donovan, CB., on the occasion of his marriage, with a solid silver tray, as a token of esteem and regard. It bore the following inscription:—

" Presented to Surgeon-General W. Donovan, C.B., on his marriage, by the Officers, R.A.M.C., who served with him in South Africa, 1905 to 1908."

Above the inscription is the crest of the R.A.M.C., and below it Surgeon-General Donovan's crest.

NOTES FROM CAIRO.—Major Forrest writes under date February 23: "There was an underlying vein of 'Le roi est mort, vive le roi' at the Christmas festivities at the hospital this year, for Colonel Jones left us on the morning of December 27 after passing on his onerous duties to the charge of Colonel Corker, our new Principal Medical Officer.

"Christmas here in hospital was much on the same lines as at most other hospitals, occupied by the lads in blue with the red necktie and slippers. The Christmas dinners and special teas were excellent; our good Matron, Miss Jones, saw to that.

"Captain Chalk, who came to Egypt on his third tour this winter, was the leading spirit at an excellent entertainment organised for the patients. The chief item of the entertainment was Captain Chalk's 'Donkey Boy,' a song which he wrote himself when he was here in 1882, with the expeditionary force. At that time it was the most popular song in Cairo. An interesting point is that it was originally accompanied by the string band of the 7th Dragoon Guards, and on this occasion (twenty-seven years later), Captain Chalk—he himself confesses he was a much smaller donkey-boy in those days—was again accompanied by the string band of the same Regiment, which is again quartered at Abbassiyeh.

"Needless to say, his get-up was faultless, and he had considerable difficulty in establishing his identity with the hospital picket.

"No. 33 Company kept Christmas in the good old English style. The right basement of the hospital was decorated splendidly under the very able and praiseworthy management of the N.C.O.'s and men of the Company.

"The most conspicuous of the decorations was a large Royal Army Medical Corps crest over the stage, made by Private Vinton. The light shining through it from behind made it look a picture of art.

"Under the supervision of the Warrant Officers, Staff-Serjeants and Serjeants of the Royal Army Medical Corps and Military Prison Staff Corps, dinner was served in fine style.

"Lieutenant.Colonel W. J. Baker, the Officer Commanding 33 Company, started the ball rolling by making a few felicitous remarks appropriate to the occasion which were received with great enthusiasm. A series of hearty cheers were given in turn for Colonel Baker, the Officers, and for Mrs. Baker and Master Baker, who were also present, a fact which was much appreciated by all.

"Dinner then followed, each man doing justice to the many courses at hand, and expressing the greatest satisfaction with regard to the excellent repast.

"The usual smoking concert was held in the evening with Serjeant-Major Brennan in the Chair and Private Wilkins at the piano, posts which they filled with great *éclat*. The company attended in strong force, several officers, the members of the Military Prison Staff Corps and many of the men's friends also being present.

"Captain Chalk sang the 'Donkey Boy of Cairo' in excellent style, and Captain Essex was warmly applauded for his song 'Moses.' Mr. O'Farrell kept the Company in roars of laughter with his speech on the 'Football Match.' Serjeant-Major Barker, of the Military Prison Staff Corps, sang 'Defaulters' and the 'Semaphore,' each song being loudly encored.

"The following also sang in excellent style, their efforts being received with marked approval:—

"Serjeant Moore, Privates Vinton, Bull, Megford, Burr, Mirams, Wright, Coe, Berryman, Pratt, Coggon (Concertina solos), and many others.

"The happy gathering dispersed at midnight, cheering all their popular officers and ably rendering the National Anthem. A special word of thanks is due to Lance-Corporal Bevan, who was Master of Ceremonies and general factotum and to whose unbounded energy the success of the dinner and concert was largely due.

"On December 29, the wives and children of the Corps were entertained to tea in the Sisters Quarters. The Matron and Sisters, Colonel and Mrs. Corker, and Lieutenant-Colonel and Mrs. Baker soon made their guests feel quite at home. The children quickly shook off their shyness and romped and played with each other and with the Sisters. After an excellent tea had been dispatched, the kiddies each received beautiful toys, and their cup of bliss was soon brimming over. Each little girl got a doll, beautifully dressed, and we have to thank Mrs. Baker for all the care and trouble she took over the dressing and execution of the variegated toilettes in which she arrayed the dolls for the party. Many were the exclamations of regret that the time had come for the breaking up of the happy gathering.

"The Serjeants were 'At Home' to Officers, Sisters, and families on December 30th. Tea was laid in the Serjeants' Mess for sixty guests, who did ample justice to the repast, thereby gladdening the hearts of their hosts. The tables were cleared after tea and preparations for merrymaking commenced. Blind-man's buff, hunt the slipper, musical chairs, and snapdragon were the favourite games and caused endless fun, children and grown-ups equally enjoying themselves.

"Later, a heavily-laden Christmas tree appeared from some mysterious corner, and

Father Christmas, in the person of our jovial Superintending Cook (Serjeant Wilkin), who is ideal in the *rôle*, distributed a large variety of toys amongst the eager, happy kiddies, who were quite satisfied that dear Santa Claus would have come down the chimney in the orthodox manner had there been such a means of admission to the Mess. The happy guests only dispersed when Morpheus began to claim many a tired but overjoyed little one.

"Life in Cairo in the winter months is a strenuous one, and the gaieties of the old days of Cleopatra and of the Pharaohs of the very dim past are well kept up.

"Officers who have served in Cairo are familiar with the string of weekly dancing festivities at Shepheard's, the Semiramis, the Ghezireh Palace, and the Savoy Hotel; with the festive dinner and supper parties which precede and follow; with the beautiful costumes of the international crowds, and with the local accounts in the newspapers.

"This is bad for the messing at the Citadel, as the Orderly Medical Officer not infrequently dines all by himself and goes to sleep afterwards over the study of some medico-military strategical problem, instead of going a weak no-trumper at bridge, had he anyone to play with.

"Those who served here a few years ago had the bulge over us in not having the long drive home to the Citadel in the wee small hours, and they knew nothing of the trials of this return journey where the tired cab horses jib at the steep Citadel Hill.

"The advantage appears on the following morning when master finds that he can take an extra half-hour in bed, being next door to his work. Incidentally, it may be mentioned that this propinquity of the mess to the hospital has been the means of saving more than one life by operation in the middle of the night. We are proud of a recent midnight operation when some of us got out of bed to assist Captain Rahilly to stitch up a ruptured kidney.

"The death-knell of the Kasr-el-Nil Barracks has been sounded, and the new barracks at Abbassiyeh are in course of construction. In the meantime, the adjacent town of Heliopolis, which is springing up in the desert, is making a bid for fame, and will cater in time largely for the amusement of the Abbassiyeh Garrison; a new polo ground is being laid out, and a new racecourse, which has been excellently planned, has been opened this year. It is a sand tract, and watching the races through glasses, from the amount of dust kicked up one is inclined to think the going very heavy; but the arab pony is accustomed to the desert, and many of the racing ponies make better time here than on the grass at Ghezireh.

"The great novelty in Cairo this year has been the flying week, also at Heliopolis. A large track of desert 5 kilometres in circumference has been boarded and fenced in fitted with stands and garages, and all the other appurtenances of a racecourse. We do not think the flying machines have attained the results that were anticipated. There is much more wind than is imagined; in fact, there was no flying for two days on this account, and we can quite imagine the disgust of the aviators at the amount of sand that could find its way into the delicate machinery of their motors.

"Notwithstanding, one or two new world's records have been established; a prize for the flight from Heliopolis to the Pyramids and back, however, still remains to be claimed.

"The end of March will see us quit of our tourist friends, and conditions similar to those obtaining in India in the summer months will prevail, and the question of leave then becomes an urgent one.

"Several officers go home tour expired next winter, and we hope to welcome some polo players amongst the reliefs."

NOTES FROM CALCUTTA.—Lieutenant-Colonel R. S. F. Henderson, R.A.M.C., Secretary to Principal Medical Officer, H.M.'s Forces in India, writes as follows, dated February 17, 1910:—

Examination.—Following officers have passed in the subjects noted: Major Faichnie, M.B., Army Medical Organization in Peace and War: Majors E. C. Anderson, D.S.O., (d) ii; A. G. Thompson, M.B., (d) ii; T. H. J. C. Goodwin, D.S.O., Technical subjects; Captain J. Fairbairn, M.B., (d) ii; Lieutenants T. T. H. Robinson, M.B., (h) ii; E. B. Lathbury (h) iii; E. D. Caddell, M.B. (h) iii; W. W. Boyce (h) iii; O. C. P. Cooke (h) ii and iii (obtained 8 marks); C. W. Bowle (d) ii and in (h) ii and iii; E. J. Kavanagh, M.B. (d) ii and in (h) ii and iii (obtained 8 marks); A. H. Jacob (d) ii and in (h) ii and iii; J. L. Wood (d) ii and in (h) ii and iii; F. T. Turner (d) ii and in (h) ii and iii; J. E. M. Boyd (h) ii; O. R. McEwen (d) ii and in (h) ii and iii (obtained 8 marks); J. du P. Langrishe, M.B. (h) iii; G. F. Rudkin (d) ii and in (h) ii and iii (obtained 8 marks); W. B. Purdon, M.B. (d) ii and in (h) ii and iii (obtained 75 marks); F. Casement, M.B. (h) ii; H. W. Fairbrother (d) ii; A. G. Wells (d) ii and in (h) ii and iii.

Leave.—The following officer is granted extension of medical certificate leave ex India :—

Captain T. S. Blackwell, from January 10, 1910, to date of embarkation.

Specialists.—The following officers are appointed specialists in the subjects named, with effect from the dates against their names :—

(*b*) *Dermatology.*—Captain E. T. Inkson, V.C., 9th (Secunderabad) Division, from March 1, 1910.

(*c*) *Advanced Operative Surgery.*—Captain F. J. Palmer, 7th (Meerut) Division, from date of assuming duties.

(*c*) *Ophthalmology.*—Major S. A. Archer, 3rd (Lahore) Division, from February 1, 1910.

(*d*) *Electrical Science.*—Captain M. C. Wetherell, 7th (Meerut) Division, from February 10, 1910. Major G. B. Riddick, Burma Division, from date of assuming duties.

(*g*) *Otology and Rhinology.*—Captain L. M. Purser, 2nd (Rawalpindi) Division, from date of assuming duties.

(*h*) *Midwifery and Diseases of Women and Children.*—Major M. M. Lowsley, 3rd (Lahore) Division, from date of assuming duties.

SPECIAL RESERVE OF OFFICERS.

ROYAL ARMY MEDICAL CORPS.

Supplementary List.

The undermentioned to be Lieutenant (on probation) :—

Stephen Gordon, dated January 13, 1910.

Eben Stuart Burt Hamilton, dated January 24, 1910.

Leopold Thomas Poole, dated January 25, 1910.

George Henderson Stevenson, dated January 20, 1910.

Sidney John Steward, M.D., dated January 28, 1910.

Keith Buchanan MacGlashan, dated February 1, 1910.

George Barton McCaul, M.D., dated February 2, 1910.

James Burrell Williamson, M.B., to be Lieutenant (on probation), dated February 12, 1910.

TERRITORIAL FORCE.

ROYAL ARMY MEDICAL CORPS.

3rd North Midland Field Ambulance.—Ernest William Strange, M.D., to be Lieutenant, dated December 24, 1909.

Attached to Units other than Medical Units.

Lieutenant James G. Miller, M.B., to be Captain, dated November 17, 1909.

ROYAL ARMY MEDICAL CORPS.

2nd Home Counties Field Ambulance.—John Livingston Hamilton to be Transport Officer, with the honorary rank of Lieutenant, dated January 5, 1910.

Attached to Units other than Medical Units.

Lieutenant Alexander B. Sloan, M.D., to be Captain, dated October 28, 1909.

Lieutenant Frederic W. Longhurst to be Captain, dated January 16, 1910.

For attachment to Units other than Medical Units.

William John Gray (late Lieutenant Queen's Rifle Volunteer Brigade, The Royal Scots (Lothian Regiment)), to be Lieutenant, dated January 1, 1910.

ROYAL ARMY MEDICAL CORPS.

3rd London General Hospital.—Major Sidney P. Phillips, M.D., to be Lieutenant-Colonel, dated December 5, 1909.

Captain Sidney H. C. Martin, M.D., to be Major, dated December 5, 1909.

Sir Victor Alexander Haden Horsley, Knight, M.B., F.R.C.S.Eng., F.R.S., to be Captain, whose services will be available on mobilisation, dated February 13, 1910.

ROYAL ARMY MEDICAL CORPS.

2nd London (City of London) Field Ambulance.—Supernumerary Transport Officer and Honorary Lieutenant Frank Stanley Turner, from 1st London (City of London) Field Ambulance, Royal Army Medical Corps, to be Transport Officer, with the honorary rank of Lieutenant (to be Supernumerary), dated November 30, 1909.

For attachment to Units other than Medical Units.

Norman Scott Carmichael, M.B., to be Lieutenant, dated December 30, 1909.

Attached to Units other than Medical Units.

Captain John Allison, M.D., to be Major, dated December 19, 1909.

Captain George Melville, M.B., resigns his commission, dated January 26, 1910.

THE QUEEN AND TERRITORIAL NURSES.

THE Queen, as President, received about 300 members of the City and County of London Territorial Nursing Service at Buckingham Palace on Saturday afternoon and presented them with their badges of office.

The badges were designed by the Queen herself. They are made of silver and they bear her Majesty's monogram. They are worn attached to a dark red ribbon with a narrow white stripe in the middle.

Among those who attended in addition to the nurses were the Secretary of State for War and Miss Haldane, the Lady Mayoress, Lady Dimsdale, Lady Truscott, Lady Mackinnon, and Surgeon-General Sir Alfred Keogh. The nurses were conducted to the Throne Room just before 3 o'clock, and the Queen, who was accompanied by Princess Victoria, entered soon afterwards. The nurses passed in file before her Majesty and received their badges.

QUEEN ALEXANDRA'S IMPERIAL MILITARY NURSING SERVICE.

The following ladies have received appointments as Staff Nurse: Miss B. Jackson, Miss M. McCormick, Miss M. T. Casswell.

Postings and Transfers.—Matron: Miss M. C. S. Knox, R.R.C., to Cork, on return from South Africa. Sisters: Miss H. L. A. Jack, to South Africa, from Woolwich; Miss M. Smith, to South Africa, from Cambridge Hospital, Aldershot; Miss A. F. Byers, to T.S. "Plassy" for duty, from Dublin; Miss L. E. C. Steen, to Netley, from Cork; Miss R. Osborne, to Woolwich, on return from South Africa; Miss M. M. Blakely, to the Queen Alexandra Military Hospital, Grosvenor Road, London, S.W., on return from Egypt. Staff Nurses: Miss C. V. S. Johnson, to South Africa, from Hounslow; Miss V. C. Paschali, to South Africa, from Dover; Miss M. H. Congleton, to South Africa, from Dover; Miss M. E. Smith, to T.S. "Plassy" for duty, from Woolwich; Miss G. H. C. Paynter, to T.S. "Plassy" for duty, from Devonport; Miss F. E. Manfield, to Cairo, on arrival in Egypt; Miss I. J. Pooley, to Egypt, from Connaught Hospital, Aldershot; Miss M. A. McCabe, to York, from London; Miss E. J. French, to Connaught Hospital, Aldershot, from London; Miss E. H. Davies, to the Queen Alexandra Military Hospital, Grosvenor Road, S. W., from York; Miss M. McCormick, to the Queen Alexandra Military Hospital, Grosvenor Road, S.W., on appointment; Miss M. T. Casswell, to the Queen Alexandra Military Hospital, Grosvenor Road, S.W., on appointment.

Appointments Confirmed.—Staff Nurses: Miss K. M. Burgess, Miss W. Halloran.

ROYAL ARMY MEDICAL COLLEGE.

LIST OF CAPTAINS WHO WILL PROBABLY BE REQUIRED TO ATTEND THE COLLEGE COURSE, COMMENCING ON NOVEMBER 1 NEXT.

F. J. Brackenridge, J. W. Brunskill, A. J. Hull, C. G. Thomson, R. B. Black (Egypfian Army), H. T. Stack, R. H. Bridges, J. G. Bell, T. S. Dudding, R. G. Wilmot, E. M. Pennefather, J. A. W. Webster, H. B. Kelly, M. G. Dill, J. B. Meldon, D. G. Carmichael, B. H. V. Dunbar, J. C. G. Carmichael, R. J. B. Buchanan, A. E. B. Wood, J. M. M. Crawford, C. Bramhall, P. Davidson, D.S.O., H. H. J. Fawcett, T. J. Wright, R. L. V. Foster, H. C. Winckworth, A. C. H. Gray, W. M. MacDowall, B. G. Patch, F. J. Turner, S. L. Pallant, R. H. MacNicol, W. Wiley, W. F. H. Vaughan, C. R. Sylvester-Bradley, D. S. Skelton, S. E. Lewis, F. C. Lambert, H. H. A. Emerson, P. Farrant, M. F. Grant, R. B. Hole, H. Harding, J. D. Richmond, M. D. Ahern, S. M. W. Meadows, A. M. Rose, E. C. Whitehead.

WAITING.

E. E. Glanville, P. J. Hanafin, A. L. Otway, A. C. Osburn.

EXAMINATIONS.

THE FOLLOWING QUESTIONS SET AT THE EXAMINATION OF QUARTERMASTER-SERJEANTS, SERJEANTS, AND CORPORALS, ROYAL ARMY MEDICAL CORPS, ARE PUBLISHED FOR GENERAL INFORMATION.

QUARTERMASTER-SERJEANTS.

Para. 285, b. 1.

(1) How is a stretcher loaded with three bearers?

(2) (*a*) Describe a field trench kitchen.

(*b*) What patterns of service kettles are issued, and for how many men does each cook?

(*c*) How is the portable stove used?

(3) What is the object of changing ranks, and how is it performed? Under what circumstances is the same movement made without changing ranks, and why?

(4) Briefly give the means you know of sick transport by road and rail, other than by ambulance wagons and ambulance trains.

(5) What is the object of drilling with ranks turned about?

(6) How would you tie up a horse so that it would not move?

(7) What points are of importance in choosing a position for a dressing station?

(8) Describe briefly the organisation of a Field Ambulance.

Para. 285, b. 2.

(1) (*a*) What Admission and Discharge Books are kept up in a Military Hospital?

(*b*) How is correspondence registered?

(2) How are cases in a Field Ambulance dieted? On what forms is subsistence obtained and how accounted for?

(3) What is the Bedding Book and its number. How kept, and by whom?

(4) What is the procedure on the occasion of a transfer from one steward to another?

(5) What is the procedure on the death of the wife of a N.C.O. or man of the Corps (whether on married roll or not)?

(6) How is the soiled linen of venereal patients treated?

(7) On what Army Forms are kitchen sundries indented and accounted for?

(8) What is the *personnel* of a Bearer Division of a Field Ambulance?

Para. 285, b. 3.

(1) Where are the public and personal clothing, equipment, and necessaries of Reservists Royal Army Medical Corps stored? and on mobilisation being ordered, how are they issued and accounted for?

(2) How is the equipment of men on detachment verified at the headquarters of a Company?

(3) You are ordered to arrange for the provision of equipment for a temporary camp; what steps would you take to obtain same, and how account for it?

(4) What clothing—public and personal—does a soldier (Royal Army Medical Corps) receive on enlistment, and what issue is made to him on his proceeding abroad (to Egypt)?

(5) How are unserviceable arms and accoutrements replaced? Who is the Accounting Officer for Equipment, Royal Army Medical Corps? When is the equipment account closed, and to whom is it rendered?

(6) An article of clothing having become prematurely unserviceable owing to inferior material; what is the procedure?

(7) What are the regulations as regards clothing of transfers to Royal Army Medical Corps?

(8) By whom is the leather work of accoutrements repaired? What is the amount allowed for a Company (Royal Army Medical Corps), and how is it obtained and accounted for?

Para. 285, b. 4.

(1) At a station abroad a supply for the medical stores is received from the Ordnance in transit. Describe the procedure?

(2) What articles of medical and surgical equipment are usually put on board ship carrying troops? What becomes of the equipment at the conclusion of the voyage?

(3) What are the regulations in force at Home Stations regarding the unpacking of cases of medicines and the storing of their contents?

(4) How are articles received into a General Medical Store accounted for?

(5) In cases where money is recovered in respect of losses, damages, or deficiencies of medical or surgical stores, what is the procedure?

(6) What medical and surgical equipment is issued to the following?—

(*a*) Administrative Medical Officer in Command, Infantry Battalion.

(*b*) A Clearing Hospital.

(7) Who has charge of the loan equipment? When issues are made, what is the procedure, and what is done when the articles are returned?

(8) How are unserviceable stores dealt with?

STAFF-SERJEANTS.

Para 284, b. 1.

(1) In what documents are entries made when: (*a*) a man is awarded detention by

a District Court Martial; (*b*) a Corporal is promoted to rank of Serjeant. What particulars should be entered?

(2) Briefly describe the procedure to be adopted on a soldier being brought forward for discharge.

(3) If a soldier wishes to change his name, what is the course to be adopted? What documents are attached to the original and duplicate attestations respectively?

(4) If a soldier arrives home from abroad for transfer to the reserve with: (*a*) his Conduct Sheet missing; (*b*) all his documents missing, what is the procedure?

(5) At what times will a Company Conduct Sheet be destroyed? What entries should be made at the top of the new sheet?

Para. 284, b. 2.

(1) (*a*) When does a soldier forfeit his pay?

(*b*) What is the rule regarding lance-pay during furlough and courses of instruction?

(2) State in detail how men on detachment are paid?

(3) Under what circumstances and by what authority may a man be reverted to a lower rate of Corps pay?

(4) How are the clothing accounts of soldiers accounted for in the pay list, and who is responsible for them?

(5) What stoppages can be made from a married soldier abroad for his wife and family who are at home? How is this money to be recovered if the soldier forfeits pay while under such stoppage?

SERJEANTS.

Para. 283, b. 1.

(1) What is the difference between the caution and the executive part of a word of Command. How and when should each be given?

(2) Define column, covering, file, section.

(3) A Company in line at the halt is required to form Company Column on the march. What is the word of Command and give the detail?

(4) What is meant by "Echelon," "File," "Reconnaissance?"

Para. 283, b. 2.

(1) Give the words of Command for proving a Company for Stretcher Drill.

(2) When carrying stretchers, how will the bearers turn on the command "At the halt, right form," and what happens on the word "Quick march"?

(8) Explain how carts or Service wagons may be utilised in place of Ambulance wagons?

(4) Eight stretcher squads are advancing and receive the order "From the right to four paces extend." How is this movement effected?

Para. 283, b. 3.

(1) How will Warrant Officers and N.C.O.'s who wear the sword salute?

(2) What points should a N.C.O. observe in dealing with a violent prisoner?

(3) For what offences would you place a soldier in close arrest?

(4) How is a crime committed by a patient in Hospital dealt with?

Para. 283, b. 4.

(1) What is the Orderly Serjeant's duty with regard to Tattoo Reports?

(2) What are the duties of the N.C.O. in charge of a Fire Picquet?

(3) What steps will a N.C.O. in charge of a room take in the case of any loss or damage occurring in his room, and why?

(4) State the procedure in making out sick reports.

Para 283, b. 5.

(1) Describe what you know of the construction of the water filter cart. How is it kept clean?

(2) Discuss the question of the most suitable hours for marching, arrival in camp, and what halts are necessary?

(3) What is the average marching pace for infantry, and what are the conditions which prevent the normal rate being maintained?

(4) Rain threatens while you are in camp. What precautions should be taken with regard to the tents?

Para. 283, b. 6.

(1) What is the duty of a N.C.O. or Orderly of the Nursing Section in a ward not nursed by Sisters when patients are too ill to look after their personal equipment?

(2) What qualification must a N.C.O. possess before his name can be registered at the Record Office for employment as a clerk?

(3) (1) What is a bedding book and how is it kept?
(2) What is the procedure as regards valuables brought to a hospital by a patient?
(4) What precautions should an Orderly on duty in a mental ward take when the patient's hair and nails require cutting?

CORPORALS.

Para. 280, e. 1.
(1) Define drunkenness on duty.
(2) By whom can the following punishment be awarded: (1) detention, (2) imprisonment?
(3) What summary punishment can a Commanding Officer award to a N.C.O.?
Para 280, e. 2.
(1) Give regulations for the ventilation of barrack rooms.
(2) How is a patrol or picket armed?
(a) When detailed to assist the civil power.
(b) When only employed in the apprehension of soldiers.
(3) What are the duties of Orderly man?
Para. 280, e. 3.
(1) How will you endeavour to keep your tent well aired and dried in camp?
(2) How should food refuse be dealt with in camp?
(3) Give the general rules concerning the care of tents in camp?
Para. 280, e. 4.
(1) Enumerate the duties of a N.C.O. in charge of a Pack Store?
(2) What are the duties of privates, general duty section, attached to wards?
(3) How would you treat a consumptive patient who commenced coughing up blood?
Para. 280, e. 5.
(1) It is required to carry a patient with a compound fracture of the leg across a valley on a stretcher. How should this be done? Explain your reasons.
(2) Why should a stretcher never be carried on the shoulders of the bearers?
(3) How would you carry a patient with a wound of the abdomen, (1) transverse wound (2) vertical wound? Give your reasons for each case.
Para. 280, e. 6.
(1) How would you proceed to rid the eye of a foreign body?
(2) Describe the treatment of shock and state how this differs from that of concussion.
(3) What general treatment would you adopt in a case of unconsciousness?
Para. 280, e. 7.
(1) What steps would you take to ventilate a small ward, containing one enteric case, during frosty weather?
(2) Is a charcoal stove a safe method of warming a bedroom? Give your reasons for and against. How would you test roughly as to the proper ventilation of a ward?
(3) What cubic space should be allowed for each patient in hospital, and how would you find the number of patients that a room would accommodate?
Para. 280, e. 8.
(1) What splints are to be found in a Medical Companion, 98 pattern, and a surgical haversack, 98 pattern?
(2) Describe the difference between the following instruments:—
(a) Bistoury and Scalpel.
(b) Sound and Catheter.
(c) Gouge and Spoon (Volkman).
(d) Ophthalmoscope and Laryngoscope.
(3) What are the uses of the following:—
(a) Guillotine.
(b) Hernia director.
(c) Aneurysm needle.
(d) Bougie.
(e) Aspirator.

UNITED SERVICES MEDICAL SOCIETY.

THE next meeting of the above-named Society will be held at the Royal Army Medical College, Grosvenor Road, S.W., on Wednesday, April 13th, 1910, at 8.30 p.m., when a paper will be read by Lieutenant-Colonel H. E. Deane (R.), R.A.M.C., on "Records of Pulse-rates after Exercises of various kinds in Trained and Untrained People; illustrated by Sphygmograms."

ROYAL ARMY MEDICAL CORPS' ANNUAL DINNER, 1910.

THE Annual Dinner of the Corps will take place on Monday, June 13, in the "Empire Rooms," Trocadero Restaurant, Piccadilly Circus, W., at 8 o'clock precisely, the Director-General in the Chair. *Officers intending to dine are requested to inform the Hon. Secretary as soon as possible*, in order that the probable number attending may be known and that tickets may be sent.

E. T. F. BIRRELL,
Major, Royal Army Medical Corps,
Hon. Sec. Sub-Committee, Royal Army Medical Corps Dinner Fund.

Ferndell
Englefield Green, Surrey.

ARMY MEDICAL OFFICERS' BENEVOLENT SOCIETY.

THE Annual General Meeting of the subscribers to the above Society will be held in the Theatre of the Royal United Service Institution at 3.30 p.m. on Monday, June 13. Those officers who wish for information on any special points are requested to communicate with the Secretary, Lieutenant-Colonel F. W. H. Davie Harris, St. George's Barracks, W.C., so that information may be furnished in response to any question asked.

F. W. H. DAVIE HARRIS,
Lieutenant-Colonel,
Secretary.

ROYAL ARMY MEDICAL CORPS FUND.

NOTICE OF THE EIGHTH ANNUAL GENERAL MEETING.

THE Eighth Annual General Meeting of subscribers to this Fund will be held in the Theatre of the Royal United Services Institution at 2 p.m. on Monday, June 13, 1910. The Director General will preside. It is hoped that officers will freely express their views on any point connected with the Fund. Those officers who may wish for information on any special point are requested to communicate with the Secretary at St. George's Barracks, W.C., so that information may be furnished in response to any question asked.

F. W. H. DAVIE HARRIS,
Lieutenant-Colonel,
Secretary.

ROSTER OF INDIAN SERVANTS.

MRS. WEIR recommends the late Major J. C. Weir's bearer, Rudramani, of District Almora, Village Gangnowla, P.O., Lohaghat, previous address, c/o Lieutenant-Colonel H. N. Thompson, D.S.O., R.A.M.C., Lucknow. Rudramani is a Hillman and a Brahman, and is recommended as honest, clean, and quite of the old style of bearer.

OBITUARY NOTICE.

LIEUTENANT-COLONEL BOILEAU.

THE death occurred at Plasnewyd, the Avenue, Trowbridge, on Friday, March 4th, of Lieutenant-Colonel John Peter Hamilton Boileau, late of the Army Medical Staff, in his 69th year. Colonel Boileau was in his usual health in the early part of the week, and on Tuesday drove over to South Wraxall to see his old friend, Mr. E. Pinckney, with Miss Boileau, reaching home about 5 o'clock. Shortly afterwards he complained of great pain, and Dr. Pearse was called in. It was evident that Colonel Boileau was seriously ill. Dr. Lace, of Bath, was telephoned for, and late in the evening an operation was performed. Deceased, however, gradually sank and died just before 5 o'clock on Friday afternoon from peritonitis.

Colonel Boileau was born on April 9, 1841, and was a son of the late Lestock Francis Boileau, R.N., Inspecting Commander of Coastguards. He was educated at Trinity College, Dublin, and was B.A. 1864, M.A. 1897, M.B. 1864, and M.D. 1873; he had the diploma of Public Health and the F.R.C.S.I. in 1874. He won prizes in chemistry, practical chemistry, materia medica, anatomy, and physiology, and first prizes in physical science (Government School of Mines) and geometry (Royal Dublin Society). He joined the Army Medical Staff, and served in the Army for about forty-two years, retiring a few years ago. Of these years he spent over fifteen abroad, in Malta, Canada, the West Indies, and India. For twelve years he was the medical officer of the 29th (Worcestershire) Regiment. For ten years he was in medical charge of the troops at Trowbridge, and when he retired from the Army he continued to reside there. Colonel Boileau was a Fellow of the Statistical Society, and a member of the Council of the Irish Medical Schools and Graduate Association (1898-1902); he was a member of the British Medical Association Committee of Council (1881-1883), and previous to that (1876-1883) he was an assistant professor of pathology at the Army Medical School, Netley. Deceased was the author of many monographs on medical subjects; some years ago he was considered the most extensive writer in the Army on medical subjects, while he frequently contributed to *The Lancet*, *British Medical Journal*, &c. Colonel Boileau saw no war service. He married a daughter of the late Dr. Bond, of Dublin, and Mrs. Boileau survives her husband. There are three daughters, two of whom married Service officers, viz., Mrs. Mosse, wife of Colonel Mosse, R.A.M.C., and Mrs. Humfrey, wife of Captain Lorne Humfrey, of the 19th (Yorkshire) Regiment, now serving in West Africa. The deceased took no part in town affairs, but he was highly respected. He was a Conservative, and by a handsome subscription assisted in the formation of the Gloucester Road Conservative Club two years ago. Colonel Boileau's brother, Colonel L. F. Boileau, Royal Engineers, who served over thirty years ago in Army, was buried at Limpley Stoke some eight years ago.

BIRTH.

THOMPSON.—At Ferozepore, India, on the 3rd inst., the wife of Major A. G. Thompson, R.A.M.C., of a daughter.

DEATHS.

HINDE.—At "Wrington," Redlands Road, Reading, on February 24, 1910, Surgeon-Major-General George Langford Hinde, C.B., retired pay, aged 77. He entered the Service on May 15, 1855, served in the 41st Foot, on the Staff, and in the Army Medical Department. He became Surgeon on September 16, 1868; Surgeon-Major, March 1, 1873; Brigade-Surgeon, April 25, 1881; Deputy-Surgeon-General, April 10, 1888; Surgeon-Major-General, January 13, 1892, and retired on retired pay on October 27, 1892. His war service was: Crimean Campaign, 1885; Siege and fall of Sevastopol. Medal with clasp; Turkish medal. South African War, 1881; Transvaal Campaign; Soudan Expedition, 1884-5; Suakin. Despatches, *London Gazette*, August 25, 1885. Medal with clasp; Bronze star; C.B. He was in receipt of a good service reward.

BOILEAU.—At Trowbridge, on March 4, 1910, Brigade Surgeon-Lieutenant-Colonel John Peter Hamilton Boileau, M.D., Army Medical Department, retired, aged 68. He entered the Service on September, 30, 1864; served on the Staff, and in the 29th Foot; became Surgeon, Army Medical Department, March 1, 1873; Surgeon-Major, September 30, 1876; Brigade Surgeon-Lieutenant-Colonel, November 23, 1889; and retired on retired pay, April 9, 1896.

EXCHANGES, &c.

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Notices.

EDITORIAL NOTICES.

The Editor will be glad to receive original communications upon professional subjects, travel, and personal experiences, &c. He will also be glad to receive items of news and information regarding matters of interest to the Corps from the various garrisons, districts, and commands at home and abroad.

All such Communications or Articles accepted and published in the "Journal of the Royal Army Medical Corps" will (unless the Author notified at the time of submission that he reserves the copyright of the Article to himself) become the property of the Library and Journal Committee, who will exercise full copyright powers concerning such Articles.

Matter intended for the Corps News should reach the Editor not later than the 15th of each month for the following month's issue. Notices of Births, Marriages, and Deaths are inserted free of charge to subscribers and members of the Corps. All these communications should be written upon one side of the paper only; they should by preference be type-written, but, if not, all proper names should be written in capital letters (or printed) to avoid mistakes, and be addressed The Editor, "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS," War Office, Whitehall, London, S.W.

Communications have been received from Major C. E. P. Fowler, Captain D. J. Skelton, Captain J. B. Clarke, Captain E. G. Ffrench, Major C. E. Pollock, Lieutenant-Colonel J. S. Green, Captain A. D. Jameson, Lieutenant-Colonel C. Birt, Major S. F. Clark, Lieutenant-Colonel R. J. S. Simpson, Lieutenant-Colonel R. W. Wright, Lieutenant-Colonel J. D. F. Donegan, H. G. Plimmer, F.L.S., Captain W. B. Fry, Captain L. W. Harrison, Captain H. T. Wilson, Major F. J. W. Porter, Captain M. W. Falkner, Captain A. W. Tufnell, Captain F. Harvey, Colonel R. H. Luce.

The following publications have been received:—

British: The Journal of Tropical Medicine and Hygiene, Medical Press and Circular, The Hospital, The Australasian Medical Gazette, The St. Thomas's Hospital Gazette, The Royal Engineers' Journal, Journal of the Royal Sanitary Institute, Proceedings of the Royal Society of Medicine, The British Health Review, The Practitioner, Red Cross and Ambulance News, The Lancet, Army and Navy Gazette, Aldershot Military Society, Annals of Tropical Medicine and Parasitology (6 *numbers*), *Public Health, Guy's Hospital Gazette, The Medical Review, Journal of the Royal Institute of Public Health, Archives of the Röntgen Ray, The Shield, The Middlesex Hospital Journal, Journal of the Royal United Service Institution, Sleeping Sickness Bureau.*

Foreign: Le Mois Médical, Russian Medical Journal, Archiv für Schiffs-und Tropen-Hygiene, Revista de Sanidad Militar y La Medicina Militar Española, Boletin de Sanidad Militar, American Medicine, Annali di Medecina Navale e Coloniale, Le Caducée, Archives de Médicine Navale, Annales d'Hygiene et de Médicine Coloniales, Deutsche Militärärztliche Zeitschrift, Japanese Journal, Giornale di Medicina Militare.

MANAGER'S NOTICES.

The Journal of the Royal Army Medical Corps is published monthly, six months constituting one volume, a volume commencing on 1st July and 1st January of each year.

The Annual Subscription is £1 (which includes postage), and should commence either on 1st July or 1st January; but if a subscriber wishes to commence at any other month he may do so by paying for the odd months between 1st July and 1st January at the rate of 1s. 8d. (one shilling and eightpence) per copy. (All subscriptions are payable in advance.)

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Officers of the Royal Army Medical Corps possessing Diplomas in Public Health, &c., are kindly requested to register their special qualifications at Headquarters. Letters of complaint are frequently received from officers stating that their special qualifications have not been shown in the Distribution List which is published as a supplement to the Journal in March and September of each year. As, however, the particulars of this list are supplied from official sources, officers are reminded that unless the possession of Diplomas, &c., has been registered at Headquarters, no entry of such qualifications can be recorded in the Distribution List.

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JOURNAL

OF THE

ROYAL ARMY MEDICAL CORPS.

Corps News.

May, 1910.

ROYAL ARMY MEDICAL CORPS.

Lieutenant-Colonel John R. Stuart, M.B., is placed on retired pay, dated March 18, 1910.

He entered the service February, 1883, became Surgeon-Major February 3, 1895; Lieutenant-Colonel, February 3, 1903; and retired on retired pay on March 18, 1910.

His war service is: Nile Expedition, 1898; Battle of Khartoum: Egytian Medal with clasp; Medal.

Lieutenant-Colonel Benjamin T. McCreery, M.B., is placed temporarily on the half-pay list on account of ill-health, dated March 6, 1910.

Captain Albert J. W. Wells retires, receiving a gratuity, dated April 13, 1910.

He entered the Army on January 29, 1901, became Captain on January 29, 1904; and retired, received a gratuity, on April 13, 1910.

His war service is: South African War, 1901-2. Operations in the Transvaal, December, 1901; operations in Cape Colony, November, 1901 to May 31, 1902. Queen's Medal with four clasps.

The undermentioned Quartermasters and Honorary Lieutenants are granted the honorary rank of Captain, dated March 17, 1910: Edwin Houghton, Richard Scott, Alexander Wilson, Henry W. Glover.

MEMORANDUM.

Surgeon-General John C. Dorman, C.M.G., M.B., to be Honorary Physician to The King, *vice* Surgeon-General Sir A. Keogh, K.C.B., M.D., retired, dated March 6, 1910.

ARRIVALS HOME FOR DUTY.—From India: Lieutenant-Colonels W. W. Pike, D.S.O., and P. C. H. Gordon. Majors A. J. Luther, T. McDermott, and St. J. B. Killery. Captains T. E. Harty, R. R. Lewis, F. H. Noke, G. E. Cathcart, J. A. Turnbull, D. P. Johnstone, F. J. Garland, and A. S. Arthur. From South Africa: Lieutenant-Colonel E. J. E. Risk; Major J. R. McMunn; Captains J. T. McEntire, N. E. Dunkerton, E. H. M. Moore, and W. McConaghy. From West Coast of Africa: Captains T. C. Lauder, J. M. Cuthbert, and A. R. C. Parsons. From Malta: Colonel J. G. MacNeece.

ARRIVALS HOME ON LEAVE.—From India: Lieutenant-Colonel D. Hennessy; Major M. Swabey; Captains E. W. Powell and J. S. Dunne. From Egypt: Lieutenant-Colonel W. J. Baker; Major J. C. Jameson; Captain E. Gibbon; Lieutenant A. E. G. Fraser.

EMBARKATIONS.—For Malta: Colonel W. G. Macpherson, C.M.G.

HIGHER RATE OF PAY.—Major F. Smith, D.S.O., has been granted the higher rate of pay under Article 317, Royal Warrant for pay and promotion after twenty years service.

ROYAL ARMY MEDICAL COLLEGE.—The name of Captain C. J. Wyatt should have been included in the list of Officers who will probably be required to attend the College course commencing in November next.

TRANSFERS TO HOME ESTABLISHMENT. — Majors F. J. Wade-Brown and G. T. K. Maurice.

POSTINGS.—To Scottish Command: Captains J. A. Turnbull and A. S. Arthur. Northern Command: Captain J. T. McEntire. Western Command: Captains F. W. Cotton, G. E. Cathcart, D, P. Johnstone, E. H. M. Moore, and F. J. Garland. Aldershot Command: Captains N. D. Dunkerton, R. R. Lewis, F. H. Noke. Eastern Command: Major T. McDermott. Captain T. E. Harty. Southern Command; Lieutenant-Colonel W. W. Pike, D.S.O., and P. C. H. Gordon; Majors J. R. McMunn, G. T. K. Maurice; Captain W. McConaghy. Irish Command: Lieutenant-Colonel E. J. E. Risk; Majors A. J. Luther, and F. J. Wade-Brown. London District: Captain A. M. MacLaughlin. Jersey: Major St. J. B. Killery.

TRANSFERS BETWEEN COMMANDS AT HOME.—Lieutenant-Colonel F. W. C. Jones from Eastern to Southern Command; Lieutenant-Colonel C. A. Lane from Southern to Eastern Command; Lieutenant-Colonel H. W. Austin from Scottish to Aldershot Command; Major A. E. Milner from London District to Southern Command; Major C. W. Profeit from Southern Command to London District; Captain R. N. Woodley from Irish to Southern Command; Lieutenant D. S. Buist from Eastern Command to London District; Lieutenant A. D. Sterling from Western to Scottish Command.

The transfer of Lieutenant-Colonel C. L. Josling to the Western Command has been cancelled.

APPOINTMENTS.—Lieutenant-Colonel E. J. E. Risk. A.M.O., Belfast District; Lieutenant-Colonel W. W. Pike, D.S.O., Charge of Military Hospital, Tidworth; Lieutenant-Colonel F. H. M. Burton, Charge of Military Hospital, Colchester; Lieutenant-Colonel C. A. Lane, Charge of Military Hospital, Hounslow; Lieutenant-Colonel P. C. H. Gordon, Charge of Military Hospital. Bulford; Lieutenant-Colonel D. M. O'Callaghan, Charge of Surgical Wards, Cambridge Hospital, Aldershot; Major M. McDermott, Specialist in Ophthalmology, Woolwich; Major J. R. McMunn, Registrar and Adjutant, Royal Victoria Hospital, Netley; Major C. W. Profeit, Specialist in Otology and Laryngology for the London District.

Captain J. H. Barbour has been elected a Fellow of the Linnean Society.

QUALIFICATIONS.—Major R. J. W. Mawhinny has obtained the Diploma of Public Health of the Royal College of Physicians and Surgeons, Ireland.

Captain M. G. Dill has obtained the degree of M.D. Edinburgh.

Captain A. H. Hayes has obtained the Membership of the Royal College of Physicians, London.

RESULTS OF EXAMINATION OF LIEUTENANTS, ROYAL ARMY MEDICAL CORPS.

The following results of examinations are notified for general information:—

Passed in (*b*) for rank of Captain; R. F. O'T. Dickinson; J. E. M. Boyd.

Major J. G. McNaught, M.D., obtained 607 marks in Cape Dutch at the Examination in January, 1910, and is recorded as a 2nd Class Interpreter.

ROYAL ARMY MEDICAL CORPS.

Discharges.—8406 Staff-Serjeant N. Cornell, April 9, 1910, termination of second period; 17286 Serjeant W. Stevens, March 24, 1910, termination of second period: 18393 Serjeant G. Skinner, March 21, 1910, termination of second period; 8391 Serjeant F. T. Foote, March 19, 1910, termination of second period; 5755 Corporal F. Willis, April 3, 1910, after one month's notice; 4361 Private H. Carr, March 18, 1910, medically unfit; 11739 Private J. Brean, March 27, 1910, termination of first period; 8403 Private C. D. Buckle, Aprll 5, 1910, termination of second period; 17522 Private G. H. Merrick, April 12, 1910, termination of engagement; 18791 Private T. Dennis, April 14, 1910, medically unfit; 10880 Private L. T. Fitzgerald, April 4, 1910, free after fourteen years' service.

Transfers to Army Reserve.—17396 Corporal E. Bairstowe, March 11, 1910; 17362 Private H. B. Shaw, March 9, 1910; 17453 Private T. Fountain, March 20, 1910; 17434 Private S. J. Beasley, March 16, 1910; 17435 Private A. Pilling, March 16, 1910; 17412 Lance-Corporal T. A. Oswald, March 14, 1910; 17442 Private J. D. Wilkinson; March 13, 1910; 17403 Private G. Collier, March 14, 1910; 17495 Private D. Arbon, March 16, 1910; 17452 Private H. Reynolds, March 18, 1910; 17472 Private J. Vautier, March 27, 1910; 1090 Private F. W. Stiles, March 29, 1910; 17817 Private G. F.

Huggett, March 7, 1910; 797 Private H. Davies, April 4, 1910; 17489 Private A. Blockley, April 2, 1910; 17502 Private C. Fish, April 2, 1910; 17511 Lance-Corporal D. Carter, April 6, 1910; 17514 Private R. Laverty, April 6, 1910; 17539 Private G. E. Munnings, April 10, 1910; 17538 Private J. Tomlinson, April 9, 1910; 1095 Private A. R. J. Haylett, April 10, 1910.

APPOINTMENTS.

To be Lance-Corporal.—Special under para. 281 S.O.: 19558 Private T. Lythgoe, March 21, 1910.

To be Buglers.—1861 Boy J. C. R. Simmons, March 22, 1910; 2091 Boy T. W. Elwood, March 29, 1910.

TRANSFERS TO OTHER CORPS.—10830 Serjeant A. Davidson, March 16, 1910, to Northern Nigeria; 11403 Serjeant Wagstaffe, April 4, 1910, to Territorial Forces; 10271 Serjeant J. R. Jebson, April 4, 1910, to Territorial Forces; 4628 Private H. McNulty, March 14, 1910, to Lancashire Fusiliers; 4699 Private F. Banks, March 14, 1910, to Gloucester Regiment; 2260 Private H. Sadler, March 23, 1910, to 5th (R.I.) Lancers; 1394 Private F. H. Clarke, March 23, 1910, to Leicester Regiment; 1120 Private H. McLachlan, March 23, 1910, to Leicester Regiment; 2096 Private W. Woodward, March 24, 1910, to R.G.A.; 1671 Private H. C. Coward, April 7, 1910, to R.G.A.

DISEMBARKATIONS FROM ABROAD.

From Sierra Leone, per ss. "Aro," March 12, 1910: 15980 Serjeant A. G. Anderton, 17714 Lance-Corporal A. R. Robinson, 19370 Private T. H. Porter.

From Sierra Leone, per ss. "Akabo," March 21, 1910: 14609 Serjeant N. P. Oldridge.

From Egypt, per H.T. "Plassy," April 1, 1910: 9441 Corporal W. Allen.

From South Africa, per H.T. "Bræmar Castle," March 3, 1910: 6665 Serjeant-Major F. J. Bollen, 7692 Quartermaster-Serjeant C. W. Beaumont, 16877 Private E. N. McCall, 19208 Private E. W. Miles, 19901 Private W. H. Martin, 1538 Private C. P. Smith, 9509 Staff-Serjeant G. Manship, 12816 Corporal D. J. Bell, 19332 Private E. A. Moore.

From South Africa, per H.T. "Soudan," April 5, 1910: 11685 Staff-Serjeant W. Cox, 10690 Staff-Serjeant P. Letoidivin, 11039 Staff-Serjeant F. Richardson, 8558 Staff-Serjeant F. Page, 10953 Staff-Serjeant W. H. Way, 9200 Staff-Serjeant T. Cross, 17901 Staff-Serjeant G. P. Jones, 11144 Staff-Serjeant A. McCreeth, 17500 Serjeant R. R. White, 11144 Serjeant M. Stroud, 17997 Lance-Corporal D. Morgan, 19260 Private E. Barker, 19608 Private C. W. McPhail, 19937 Private G. T. Platford, 18298 Private G. Quinn, 19965 Private J. Reilly, 19161 Private G. Parkinson, 18568 Private J. D'Foole, 2180 Private T. W. G. Rogers, 19693 Private J. J. Hitchings, 19237 Private W. O. Naylor, 18084 Private H. Simpson, 19817 Private V. S. Painter, 12217 Private T. Cockayne.

THE FOLLOWING N.C.O.'S AND MEN HAVE QUALIFIED FOR PROMOTION IN THE VARIOUS CORPS EXAMINATIONS:—

For Quartermaster-Serjeant.—11714 Staff-Serjeant E. Kerstein, 11338 Staff-Serjeant W. Grove.

For Staff-Serjeant.—10898 Serjeant A. J. Burke, 11417 Serjeant A. Bush, 12890 Serjeant J. S. Gardiner.

For Serjeant.—17857 Corporal A. E. Macklin, 16289 Corporal C. G. Hearn, 11074 Lance-Corporal A. J. Daintree, 15725 Lance-Corporal T. Eastwood, 12506 Corporal P. J. O'Rourke.

For Corporal.—12175 Private W. Murphy, 19597 Private L. Brindle, 1375 Private H. Shipton, 17711 Private D. C. Holland, 18725 Private I. Loweth, 18741 Private S. D. Fernie, 17965 Private I. J. J. Thompson, 19472 Private C. E. Munson, 511 Private F. Beauchamp, 530 Private A. Adams, 1845 Private A. Cook.

Qualified as Dispensers.—17857 Corporal A. E. Macklen, 12965 Lance-Serjeant H. E. Tyler, 19558 Private T. Lythgoe, 11275 Corporal A. Breewood, 15970 Private C. R. Warren, 15483 Corporal E. Sharp, 17057 Corporal M. Ward, 19734 Private H. F. Peters, 17730 Corporal P. Wills.

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S. Parton,* Serjeant C. Pegg, Serjeant-Major J. T. Packard, Staff-Serjeant W. E. Perritt,* Serjeant J. W. Parsons,* Quartermaster-Serjeant A. G. Powell, Serjeant G. W. Palmer,* Serjeant G. Pottinger,* Mr. E. Perrin, Mr. W. E. Paxman,* Mr. W. Perkins, Serjeant J. E. Pugh, Quartermaster-Serjeant J. W.

Piercy, Serjeant H. Parker, Mr. W. Price, Mr. A. Patten,* Serjeant G. W. Payne, Staff-Serjeant W. Pritchard, Serjeant W. H. Parr, Quartermaster-Serjeant M. Powell,* Staff-Serjeant A. Pitchforth, Serjeant C. Primer, Staff-Serjeant R. T. Pack,* Mr. Quarrington,* Mr. J. J. B. Rampton, Serjeant-Major J. Ritchie,* Mr. J. Rannie, Mr. A. Rand,* Staff-Serjeant J. H. H. Rothery, Mr. E. F. Robertson, Mr. G. Reynolds, Staff-Serjeant H. W. Rose, Mr. Riding, Serjeant-Major G. H. Roberts,* Serjeant Robson,* Bandmaster G. P. Robertson,* Serjeant-Major W. T. Spencer,* Serjeant-Major E. H. Senior.* Mr. Shaw, Staff-Serjeant A. E. Shaw,* Serjeant-Major S. Stevens, Serjeant-Major C. H. Smith,* Serjeant W. C. Slater, Lieutenant and Quartermaster E. V. Saunders, Quartermaster-Serjeant W. H. Storey, Mr. W. Sargeant,* Mr. W. Singleton,* Staff-Serjeant W. E. Squire, Mr. R. Smellie, Mr. G. R. Spring, Mr. H. J. Stacey, Mr. C. Steel, Mr. W. Shannon,* Quartermaster-Serjeant C. J. Strong,* Serjeant H. Steele,* Serjeant E. Steele, Staff-Serjeant J. Sallis, Serjeant G. Skinner, Staff-Serjeant H. Sprinks, Mr. F. J. Spary, Serjeant R. Sproule, Mr. J. J. Saunders,* Serjeant P. T. Simes, Serjeant E. B. Snowden,* Serjeant A. Senior,* Serjeant J. Sage,* Serjeant W. E. Saunders,* Mr. W. S. Towers,* Staff-Serjeant E. Thuillier,* Staff-Serjeant L. E. W. Tempest,* Staff-Serjeant C. J. Tunn, Serjeant-Major W. H. Taylor,* Serjeant-Major T. J. Tilbrook,* Quartermaster-Serjeant W. A. Taylor, Serjeant-Major A. G. Tod, Mr. W. H. Turner, Serjeant J. G. Thomas, Staff-Serjeant S. Taylor,* Staff-Serjeant B. Townend, Mr. H. H. Taylor,* Serjeant W. Tindall, Serjeant H. L. Thompson, Serjeant-Major E. J. Tilbury, Serjeant C. Valance, Serjeant H. V. Virgo,* Lieutenant and Quartermaster J. Wilson,* Staff-Serjeant J. W. Willsher,* Serjeant-Major W. Wilson,* Serjeant T. R. Wilson, Staff-Serjeant H. Wilkins,* Mr. H. B. Wall, Quartermaster-Serjeant J. Wickersham,* Serjeant W. J. Wilson,* Mr. J. Webb, Mr. G. M. Wright,* Mr. F. W. Wakefield, Staff-Serjeant C. Ward, Serjeant-Major J. Woollard,* Staff-Serjeant F. Waller, Serjeant C. Webberley,* Serjeant H. G. Wales, Serjeant C. B. Willsher, Serjeant J. Worswick, Mr. E. J. Warwick,* Staff-Serjeant H. Williams,* Staff-Serjeant W. H. Way,* Serjeant J. S. Whestone,* Quartermaster-Serjeant G. B. Walker,' Staff-Serjeant E. C. Young, Quartermaster-Serjeant C. J. Yeates.

The second dinner of the Club was held in the International Hall of the Monico Restaurant, Regent Street, W., on Wednesday, April 6.

The dinner was ordered for 7.30 p.m., but, as in the preceding year, members began to assemble at 6.30 p.m., arriving in increasing numbers as the hour for dining approached, the number of diners reaching the respectable total of 179.

The chair was taken by the President, Surgeon-General W. L. Gubbins, C.B., M.V.O., M.B., the Director-General, A.M.S.

The guests of the club were: the late Director-General, Surgeon-General Sir A. Keogh, K.C.B., M.D., K.H.P.; Surgeon-General W. Babtie, V.C., C.M.G., M.B.; Lieutenant Colonel E. M. Wilson, C.B., C.M.G., D.S.O.; Major H. S. Thurston and Major W. H. Horrocks.

The other officers present were: Colonel Sir D. Bruce, C.B., F.R.S., M.B.; Colonel D. Wardrop, C.V.O., M.B.: Lieutenant-Colonels R. H. S. Sawyer, M.B., F.R.C.S.I.; W. Dick, M.B., F.R.C.S.; E. Eckersley, M.B.; J. M. Irwin, M.B.; Sir W. B. Leishman, M.B.: C. H. Melville, M.B.; M. W. Russell; Majors B. H. Scott; E. T. F. Birrell, M.B.; A. P. Blenkinsop; H. J. M. Buist, D.S.O., M.B.; F. W. Gibbard, M.B.: C. C. Fleming, D.S.O., M.B.; T. P. Jones, M.B.; C. F. Wanhill; A. Bruce; Captains F. S. Irvine, M.B.; J. M. M. Crawford, F.R.C.S.I.; F. M. Parry, M.B.; J. McClay; Lieutenants J. Wilson and C. W. Kinsella.

During the dinner a very strong contingent of the Royal Army Medical Corps Band, under the personal conductorship of Mr. Robertson, the Bandmaster, discoursed most enjoyable music, giving many past members of the Corps their first opportunity of hearing their own Band. The band, having been inaugurated long after some of our members left the service, was one of the outward visible signs of the advanced strides made by the Corps in recent years.

Amongst the past members of the Corps we noticed:—Mr. H. H. Taylor, in the picturesque Highland costume of the Queen Victoria School, Dunblane; Squadron-Corporal-Majors H. J. Carroll and P. O'Flynn, both wearing the brilliant dress of the Household Troops, and Staff-Sergeant F. Caseley, in the pretty grey and blue uniform of the Officers Training Corps, Cambridge University.

Dinner over, and the toast of "The King" having been duly honoured, the flow

* Present at the dinner.

of personal greetings and reminiscences continued, interrupted only by attention to the speeches, which commenced with a toast to the chair and guests by Sergeant-Major Clark.

TOAST—"THE CHAIRMAN AND GUESTS."

"Surgeon-General Gubbins, Officers, and Comrades: In the words of a famous Scottish bard, 'Again the silent wheels of time their annual round have driven," and to quote an old friend, the clown in the pantomime, 'Here we are again,' in the same room, with a gratifying proportion of the same faces, besides numerous new ones, with the same speaker—my unworthy self—to voice the same sentiment regarding the same chairman.

"The same chairman, true, but with a difference, for this year we are in the happy position of welcoming in his person the Director-General of our Department. And what shall I say concerning him? What *can* I tell you that you do not already know? Were I addressing a mixed company, the correct thing, no doubt, would be for me to give a panegyric, but, speaking as a soldier about a soldier to a gathering of soldiers, I am happily absolved from any such necessity. The fierce light which we are told beats about a throne has its counterpart in the military searchlight constantly shining on the official lives of our chiefs. We are, however, extremely grateful for his continued kindly interest in us, and for his presence and presidency at our decorous revels. We, on our part, can merit a continuance of his recognition by maintaining the high tone, not only of this gathering, but also, so far as in us lies, of the Corps to which we have the honour to belong.

"I well remember (although reminiscences are rather to be tabooed on such an occasion as this) some years ago travelling on the Underground in company with a fellow warrant-officer of the Corps, who, by the way, is present here to-night, both of us being in mufti. We were seated near two dear garrulous old ladies, who, as dear old ladies sometimes will, were talking in a rather high tone of voice, so that we could not avoid hearing what was said. The subject of their conversation was a case of military dirty linen washing, very much in the public eye at the time. Imagine our mortification when one old dame remarked to the other, in the tone of one who states an accepted and incontrovertible truth: 'Yes, my dear, those Army warrant-officers are an *awfully* second-rate lot.' Now, it behoves everyone here to prove, by personal example, to prejudiced persons (not always of the gentler sex I am sorry to say) that warrant-officers and serjeants, anyhow, of the Royal Army Medical Corps, are a *first-rate* lot.

"In one respect I feel assured our Chairman will consider himself singularly fortunate—in being supported by such a distinguished group of officers, guests of the club, or of individual members of the club. We have here to-night representatives of those officers of the department who have led the Corps by the devious paths of scientific research, over the rougher fields of active service, or through the thorny thickets of the higher administration, to that proud eminence it now occupies. An English philosopher, away back somewhere in the middle ages, said that praise is the reflection of virtue, but for me to bestow praise on officers, some of whose names are writ high on the scroll of fame and known far beyond the comparatively narrow bounds of their Corps, would be an act of supererogation—painting the lily, in fact. Suffice it for me to say that we appreciate to the full the honour conferred on us by their presence, and welcome them heartily to our midst.

"We are in the enviable position of having no opposition to contend with in our club; nevertheless, I will now apply the guillotine to my remarks, which will serve as a prelude to the toast which I will now propose for your acceptance, and which I trust you will honour with that enthusiasm which is its due. Gentlemen! 'The Chairman and Guests.'"

The Chairman-Surgeon-General Gubbins (in reply) said:

"Serjeant Major Clark and Gentlemen,—When you did me the honour of placing me in the Chair last year on the occasion of the inaugural dinner of your Club which had just been formed for social purposes, I ventured to express the hope that it would grow and prosper as time went on. These anticipations have been more than fulfilled, as the figures handed me by the energetic president of your committee (Serjeant-Major Spencer) indicate. In 1909 there were 240 members of whom 124 attended the dinner. To-night they amount to 329 of whom 179 are dining: this is very encouraging, and I can only urge on all who are eligible to join the Club without delay. During the past year no less than ten Quartermasters have retired, and two of these are deserving of

more than ordinary mention—I refer to Captains Morrison and Bruce. The first-named officer received special commendation for his services in connection with the relief expedition sent last year from Malta to Sicily on the occasion of the terrible earthquake which wrung the heart of the whole civilised world. Captain Bruce was, I may say, an enthusiast in military X-ray work, and I can recollect his urgent despatch from Egypt to Natal in the autumn of 1899, where he formed one of the besieged garrison in Ladysmith and rendered valuable services in this particular line. I may remark, incidentally, that we are now in sight of the end of the block in promotion to commissioned rank caused by the South African War, and we hope that matters will reach their normal state in this respect by July next. I must also welcome home on your behalf Staff-Serjeant Gibbons, who was specially promoted to his present rank for services in connection with the Sleeping Sickness Commission in Central Africa under Sir David Bruce. Lastly, I must pay a tribute to the good work of your senior Warrant Officer on the active list, Serjeant-Major Clark, who is now about to leave the War Office on expiration of his appointment.

"It may not be out of place on an occasion like the present, to draw your attention to the standard of education in the Corps. Leaving out decimals I find that by the last returns the percentage of men certificated is in the following Corps: A.O.C. 86, R.E. 76, R.G.A. 71, R.A.M.C. 68. Now I do not consider this satisfactory, and I would like to see our Corps take a much higher place. You gentlemen who are on the active list can do much to stimulate and influence the younger soldiers in availing themselves of the schools that are within reach of all; there are also present many members who are fathers of families, and to these I would say the best legacy you can leave your children is a sound education. As an example, I might mention that within the past few weeks a daughter of one of our most esteemed Quartermasters competed for a well-paid and highly-desirable scholastic post in the North of England: as a result of her attainments she was successful against all comers, she and her parents thus reaping their reward.

"There are two countries which have been pre-eminent for the attention they have paid to this most important subject, viz., Prussia and Scotland. In the first named that great reformer, Martin Luther, assisted by his friend Melancthon, laid the foundation of a system of education which was subsequently developed by Frederick the Great, whilst in Scotland another great reformer, John Knox, sketched out a system of compulsory free education for the poor. He was in advance of his time, however, for this was not instituted until the end of the seventeenth century, but the indisputable fact remains that the inhabitants of these two countries had a great start in the battle of life, and consequently have enjoyed—and deservedly so—more than their share of the good things that are going. England lagged behind, and it was not until the introduction of Mr. Foster's Education Act on February 16, 1870 (a memorable day in our history), that any attempt was made to grapple with the problem. The question we have to ask is, Have we availed ourselves of the opportunities within our reach? I am all the more encouraged to discant on this subject, as sitting on my right is our late Director-General, who has recently been appointed Rector of the Imperial College of Science and Technology on retiring from the Army. The Council of the College, acting on the principle guiding the selection of the Viceroy of India, viz., that a complete stranger with a broad mind and without any preconceived ideas is the best for the post, selected Sir Alfred Keogh, not only for the above reasons, but also on account of his great organising ability. Now his chief duty in his new sphere will be to co-ordinate the various branches of instruction in that great College, and afford those students who are seeking a commercial or scientific education an opportunity of obtaining it at the least possible cost and delay.

"Having moralised on education, let me turn to a totally different subject, viz., football. This is a sport in which I take great interest, and I always look back with pleasure to the days when, as a cadet at Netley, I was Captain of the Rugby fifteen during a season when the team held, practically, an unbroken record. It is, therefore, with pleasure that I read out the following telegram from Portsmouth, which has just been placed in my hands: 'R.A.M.C. three goals, Royal Marines two, Hants senior cup.' This is good news, and I only hope the Corps will be equally successful in the final, which is to be played on 18th inst., at Portsmouth. I am a great believer in 'the sound mind in the healthy body,' and, consistent with the faithful performance of duty, out-door sports of this nature are to be encouraged; they help to harden us for service in the field which is, when you come to think of it, the object of our existing at all.

"In conclusion, I would like to say a word about the Band, which has given us so much pleasure, and I think the Committee decided wisely in securing its attendance so as to give you an opportunity of listening to it at least once in the twelve months. It has, as I think you will admit, reached a high pitch of excellence under its present conductor, Mr. Robertson, and has contributed in no small degree to our enjoyment on the present occasion.

"Gentlemen, it only remains for me to thank you on behalf of my fellow-guests and myself for yonr hospitality, and to wish your Club continued and increasing prosperity."

Later in the evening the late Director-General, Sir Alfred Keogh, addressed the gathering:—

"Surgeon-General Gubbins and Comrades,—I hardly know whether I am allowed to say 'Comrades,' but it is difficult thus early to remember that I am a retired officer. I am called upon to address you and unexpectedly; it is difficult to choose a subject from amongst the many things I find it in my heart to say. I regard this gathering of past and present warrant-officers and serjeants, 180 in number, as marking definitely the success of the Club, and I am not a little proud to think that I was the Director-General who was responsible, after yourselves, for its formation.

"A dinner like this appeals especially to me, in that I regard it as one more evidence of the death of Departmentalism, and of the strength of the Corps' sentiment. That sentiment means efficiency. To belong to a Corps means that you belong to a united body of officers, warrant officers, non-commissioned officers and men, eager for efficiency, zealous of their reputation, and proud of their traditions. These are sentiments worth living for and worth working for. I trust I have been animated by them during my service with you. They have led us all to new things, and have forced forward modern developments. The Corps spirit is the strongest incentive to efficiency and to the maintenance of the highest standard of honour.

"Perhaps I may be allowed to mention here a matter which I should have mentioned had I been able to accept your invitation to occupy the chair last year. I desire to call to your notice the existence of the Army and Navy Male Nurses' Co-operation, which was started with a view to bringing into prominence the fact that Royal Army Medical Corps soldiers seeking employment in civil life can be guaranteed to be highly trained and are worthy of the fullest confidence. This is a very important matter. We do not know who have previously represented us in civil life as military nurses, and we have been determined that the good name and reputation of our men shall be protected through the medium of an organisation whose specific duty it shall be to provide only men of the highest character and training. These facts should be known in the Corps, so that men who have learned their profession in the Army shall be able to continue to practise it after their retirement, and to practise with the support of an influential body of men and women. By means of this organisation, and by means of the Corps Fund, we have a practical method of standing by our men in time of trouble and difficulty. The Corps Fund owes its origin to the Corps spirit, which led us to resolve that no one who once belonged to us, whether man or woman or child, should ever be forgotten if ill-fortune overtook them. So far as I know—I have said it often—there is no man, woman, or child of the Royal Army Medical Corps to-day in need of help which we are not ready to give. But I shall ramble on in this strain if you do not remind me that time is short. Moreover, I am unprepared with a speech. My last words to you shall, however, be on the same topic, for it seethes within me. Be jealous of your glorious traditions, continue to move forward, constantly increasing in efficiency, a credit to yourselves and an honour to the Army to which you belong."

Notice.—Copies of the photograph may be obtained on application to:—
Messrs. J. Jacks and Co.,
22, Glasshouse Street,
London, W.

The members of the Club held their Second Annual Meeting at the Serjeants' Mess, Millbank Barracks, London, S.W., on Saturday, April 23, for the purpose of reviewing the accounts of the past year, electing a committee for the ensuing year, and transacting such other business as may be.

The Hon. Secretary read the following statement of accounts, which was passed unanimously.

JACKS & Co., I

Receipts.	£	s.	d.	Expenditure.	£	s.	d.
By balance, cash brought forward	11	10	3	To 76 Copies of Corps News, May, 1909, for Circulation to Past Members ..	0	12	8
,, Cash from 90 New Members as Joining Fees ..	4	10	0	,, Printing and Stationery..	5	0	3
,, Cash from 316 Members for Subscriptions	15	16	0	,, Postage	2	19	0½
,, Cash for dinner tickets ..	38	9	6	,, Band Fees, Railway Fares, Supper and Refreshments	7	5	3
				,, Cost of Dinner	41	7	0
					£57	4	2¼
				Cash in hand	13	1	6¾
	£70	5	9		£70	5	9

Balance Cr. 13 1 6¾

H. S. THURSTON, *Major, R.A.M.C.*
C. H. SMITH, *Serjeant-Major, R.A.M.C.* } *Hon. Treasurers.*

Audited and found correct,
G. W. STACY BUSH.
G. B. WALKER, *Quartermaster-Sergeant, R.A.M.C.*

April 23, 1910.

The undermentioned were then elected to serve on the Committee for the ensuing year.

President.

Serjeant-Major R. H. Green.

Hon. Treasurers.

Major H. S. Thurston, Serjeant-Major C. H. Smith.

Members.

Mr. A. Mallord.
Quartermaster-Serjeant G. B. Walker.
Mr. G. W. S. Bush.
Quartermaster-Serjeant R. Cox.
Mr. J. Genese.
Serjeant H. Steele.

Hon. Secretary.

Mr. H. Porter.

N.B.—Members are particularly requested to note the change in appointment of the Hon. Secretary.

Communications should now be addressed as follows—Mr. H. Porter, 12, Cotford Road, Thornton Heath, Surrey.

NOTES FROM ALDERSHOT.—By permission of Surgeon-General Sir T. J. Gallwey, K.C.M.G., C.B., M.D., and officers of the Royal Army Medical Corps, Aldershot, the string band of the Corps gave a concert at the Officers' Club here on March 1, 1910. The regiments and corps stationed at Aldershot possessing string bands have for the last two or three seasons given concerts at the Officers' Club, and the band of the Royal Army Medical Corps having given a very successful one last year was asked to do so this year. There was a very large attendance, and every one has assured us that the band more than kept up the high reputation it has earned for itself in Aldershot. We were extremely fortunate in having the assistance of Miss Marian Jay, Mr. Roland Jackson, Lieutenant-Colonel Treherne, and Captain J. S. Bostock, R.A.M.C., and the thanks of every one is due to these artistes for so kindly contributing to the success of the concert.

The programme was as follows :—

"PROGRAMME.

"PART 1.

1. *March*	'Pomp and Circumstance' BAND R.A.M.C.		*Elgar.*
2. *Song*	'To Phyllida' Captain J. S. BOSTOCK, R.A.M.C.		*Teresa del Riego.*
3. *Three Hungarian Dances*	BAND R.A.M.C.		*Brahms.*
4. *Song*	'She is Far from the Land' Mr. ROLAND JACKSON.		*Lambert.*
5. *Violin Solo*	(a) 'Arioso' (b) 'Allegro' Miss MARIAN JAY.		*Fiocco.*

"Interval.

"PART 2.

1. *Suite from the Ballet* 'Egyptien'	BAND R.A.M.C.		*Luigini.*
2. *Old Hungarian Melodies*	(a) 'Far and High' (b) 'See the Star' Mr. RONALD JACKSON.		*Korbay.*
3. *Violin Solo*	'Zigeunerweisen' Miss MARIAN JAY.		*Sarasate.*
4. *Songs*	(a) 'Our Little Love is Newly Born' (b) 'Gentle Dame Priscilla' Captain J. S. BOSTOCK, R.A.M.C.		*Coningsby Clarke.*
5. *Overture*	No. 2 in F BAND R.A.M.C.		*Kalliwoda.*

"'GOD SAVE THE KING.'"

The following account of the concert is taken from *Sheldrake's Journal*, March 4, 1910 :—

"ROYAL ARMY MEDICAL CORPS BAND CONCERT.

"Few more thoroughly enjoyable concerts have been given at the Officers' Club, Aldershot, than that which took place on Tuesday afternoon, by permission of Surgeon-General Sir T. J. Gallwey, K.C.M.G., C.B., M.D., and officers of the Royal Army Medical Corps, by the string band of that corps, under the conductorship of Mr. Geo. Pringle Robertson, their talented bandmaster. Lieutenant-Colonel F. H. Treherne, R.A.M.C., kindly took an active interest in the success of the concert, and acted as accompanist. The assembly was large and fashionable, and well worthy the excellent programme which had been prepared. Commencing at 4, and not concluding until a trifle to 6 o'clock, the company was provided with a continuous flow of delightful music, instrumental and vocal alike, and such as to bring forth the ungrudging applause of a clubhouse audience. The band is to be specially congratulated upon the effort, for it was one that proved all successful, and when it is remembered that it is an entirely voluntary one, with general military duties to perform, its standard of musical proficiency is all the more pronounced and surprising. Such a band is well worthy of the utmost consideration that can be given to it by the heads of the Department, and none would be more ready to recognise this than Sir. T. J. Gallwey himself. Supplementing the efforts of the band were those of Miss Marian Jay, violinist, Mr. Ronald Jackson, and Captain J. S. Bostock, R.A.M.C., vocalists, and a purer-voiced tenor than Mr. Jackson proved himself to be has never been heard at the Club.

"The programme was opened with a fine rendering of that always successful march of Elgar's, 'Pomp and Circumstance.' All the finer and nobler passages were cleverly handled, and the warm applause which was accorded the interpretation was thoroughly deserved. It proved a nice prelude to Captain J. S. Bostock's song, 'To Phyllida' (Teresa del Riego), and the initial vocalist of the afternoon at once established himself a favourite. An encore was demanded and responded to, 'Grey Days' (Noel Johnson) being substituted, and proving equally enjoyable. Captain Bostock made way for Brahm's arrangement of 'Three Hungarian Dances,' in the rendering of which the band again cleverly acquitted itself. The vocal treat of the afternoon, and that with no disparagement to the previous singer, followed. It was that of Lambert's song, 'She is far from the Land,' by Mr. Ronald Jackson, a tenor who simply charmed his

audience by the purity and compass of his voice. There was a spontaneous outburst of applause, and an encore was quite undeniable. And the audience had its desire granted by perhaps an even more beautiful number, 'Midsummer Love's Song' (Godfrey Nutting). The only fault concerning the song was its brevity—the audience parting with the singer with the greatest reluctance, but the vocalist had to give way to an equally talented instrumentalist—Miss Marian Jay, whose violin solo, (a) 'Arioso' (b) 'Allegro' (Fiocco) simply held the company riveted. In recognition of, and in response to, the outburst of applause Miss Marian Jay responded by an exquisite performance of a minuet by Handel. A hearty attempt was made to obtain a double encore, but to that the talented lady was not a party.

"A brief interval for tea having elapsed, the concluding part of the programme opened with the band's rendering of Luigini's suite from the ballet, 'Egyptien,' and a charming number it proved to be, typical of the fair land it portrayed. The conductor was compelled to acquiesce in the demand for an encore. and Capua's 'O Sole Mio' was the response, this being also heartily applauded. Mr. Ronald Jackson, on reappearing, was also a participant in the appreciatory tokens of the audience, and after his faultless rendering of two old Hungarian melodies, (a) 'Far and High' and (b) 'See the Star' (Korbay), he more than established himself a favourite at the Club. Like all true artistes he entered fully into the spirit of delight of his audience by happily smiling his thanks, but wild horses, so to speak, could not induce him to return and give an encore. The audience was more successful in this direction with Miss Marian Jay, who obliged with an encore for her violin solo, 'Zigeunerweisen' (Sarasate), by reappearing and playing Gossec's solo, 'Tambourin,' both, of course, delighting all. Captain J. S. Bostock proved a faithful exponent of Coningsby's Clark's songs, (a) 'Our Little Love is Newly Born' and 'Gentle Dame Priscilla,' each number suiting the singer's voice and style to perfection. Lastly came the band's overture, Kalliwoda's 'No. 2 in F.' Here, again, real merit met its own reward, and Mr. Robertson's musicians had to give an encore—namely, a Spanish Dance by Schmeling, that was applauded to the echo. The Corps' regimental march 'Her Bright Smile Haunts me Still,' was the prelude to 'God Save the King,' which concluded a really delightful afternoon's entertainment."

NOTES FROM CHATHAM.—Serjeant-Major H. T. Ford writes: On "Wednesday evening, 6th inst., a most excellent concert was given by Staff-Quartermaster-Serjeant Williams, A. P. Corps, and his friends, to the patients, staff, and families, Royal Army Medical Corps, at Fort Pitt.

"The programme was as under:—

"PART 1.

1. *Pianoforte Selection*		Mr. SHILEBEER.
2. *Song*	'Blue Skies'	Miss BISHOP.
3. *Song*	'The Bassoon'	Staff-Qmr.-Serjt. WILLIAMS.
4. *Duet*	'Larboard Watch'	Messrs. MANGLES and POULTER.
5. *Song*	'Sweet and Low'	Miss LAWRENCE.
6. *Pianoforte Solo*	'Crazy Sam'	Miss MARY GARVEY.
7. *Song*	'Mary'	Mr. MANGLES.
8. *Song*	'Viva Italiano'	Staff-Qmr.-Serjt. WILLIAMS.
9. *Song*	'When the Ebb Tide Flows'	Mr. POULTER.

"Interval.

"PART 2.

1. *Pianoforte Selection*	'Popular Choruses'	Mr. SHILEBEER.
2. *Song*	'A Dream of Paradise'	Miss BISHOP.
Encore	'Daddy'	,,
3. *Duet*	'Life's Dream is o'er'	Miss WILLIAMS and Staff-Qmr.-Serjt. WILLIAMS.
4. *Song*	'The Bugler'	Staff-Serj. HODGSON, R.A.M.C.
5. *Song*	'Old Father Thames'	Staff-Qmr.-Serjt. WILLIAMS.
6. *Song*	'A Song of Thanksgiving'	Miss LAWRENCE.
7. *Song*	'Can't You Take My Word?'	Mr. POULTER.
Encore	'Covent Garden Market'	,,

"'GOD SAVE THE KING.'

"The whole of the programme was so well carried out that it is very difficult to single out any special individual artist for special praise, but Miss Bishop and Staff-Quarter-

master Serjeant Williams were undoubtedly 'star turns.' Mr. Poulter's 'Can't You Take My Word?' was also highly appreciated.

"Major A. Pearse, R.A.M.C., proposed a vote of thanks to Staff-Quartermaster-Serjeant Williams and his party for their kindness in giving the concert, and hoped for a repetition in the near future, which was carried unanimously by everyone present."

NOTES FROM TIDWORTH.—Major Fleury writes; "The winter, thank goodness, appears to be over—I say, advisedly, appears—for you never know from one day to another what is going to happen in Tidworth. Any way officially it has ended, and here we are in the middle of April and up to our necks in summer training. The details of the summer training will keep, so I may as well get on and recount what has happened since the last notes from Tidworth appeared in the December number.

"The following officers have left the district: Captain G. Baillie for the West Coast of Africa; Captain R. F. M. Fawcett for Gosport; Lieutenants Petit, McCombe, and Byatt, all for India.

"The following officers have arrived: Major G. T. K. Maurice, Captain A. E. Thorpe, Captain R. N. Woodley. All three have been posted to Bulford, the latter in charge of the Families' Hospital.

"Lieutenants A. G. Jones and B. A. Odlum, for duty at Tidworth, the latter returning here after being away some months on leave on medical certificate, following enteric fever, contracted in the spring of 1909. We were all glad to see him return about twice the size he left us.

"Miss E. A. Cox, the Matron, has recently left for the Connaught Hospital, Aldershot. I feel sure I am only echoing the sentiments of all ranks in the 20th Company, R.A.M.C., when I say that we have to thank her for all she has done at Tidworth, and for many acts of kindness during the past two years, and wish her success and good luck at her new station.

"Miss L. E. C. Steen from Netley, has taken over the duties of Matron. I feel sure she will appreciate the change. Impending moves are many. It is evidently a good season for Lieutenant-Colonels, as I hear the Tidworth bag is one and a half brace.

"Lieutenant-Colonel C. A. Lane, Officer Commanding 20th Company, and Officer in Charge, Military Hospital, Tidworth, is shortly leaving for Hounslow, Lieutenant-Colonel W. W. Pike, D.S.O., taking over his duties here.

"Lieutenant-Colonel F. W. C. Jones and Lieutenant-Colonel P. C. H. Gordon, are also joining the District for duty.

"Major C. W. Profeit has been posted from Bulford to London.

"Regarding the coming summer. The air is full of rumours of all that may happen—mobilisation of field ambulances, &c., &c., but I must not give away official secrets even if I knew them.

"Troops from all parts will soon be arriving on the Plain. The Camp at Larkhill has been open since March 15, Lieutenant M. J. Williamson in medical charge. I rather guess he has not found it too warm under canvas the last three weeks.

"Our old friend, the River Bourne, has been in flood for months. The Ordnance maps will certainly have to be amended if this state of affairs continues.

"The past football season has been a disastrous one for the 20th Company. They finished bottom of the Junior League, and will take some moving from this position. Many of the matches were only just lost, and on several occasions our men had to play under trying conditions; however, their position at the bottom of the League this year is a secure one.

"At the R.A. Point to Point Meeting held recently, Captain Cowey rode in the 'Harriers Cup,' and came in fifth. He experienced distinctly hard lines, as the horse he had trained for the race went wrong at the last moment and he had to rely on his second string.

NOTES FROM GIBRALTAR.—Major H. A. L. Howell writes: "It is a long time since you had any notes from Gibraltar, but there is really very little to write about.

"This winter the Company went in very strongly for dancing, and, joining in with the Naval Hospital Medical Attendants, formed a Quadrille Club which gave some very popular and successful dances. Our Serjeants and Warrant Officers, however, gave a particularly good dance 'on their own' on St. Patrick's Day, of which the following account appeared in the *Gibraltar Chronicle*:—

"'The members of the Royal Army Medical Corps Serjeants' Mess gave a most successful dance on Thursday night at the Garrison Gymnasium to celebrate the

anniversary of Ireland's Patron Saint. To Irishmen and Irishwomen all the world over the 17th is the day of the year. It symbolises to them the continued existence of their nation. It is a memory of their country's past and an annual reminder of their country, homes, and friends. It is not, as so many people think, a mere day of jollification. It serves a higher purpose, it stimulates and keeps alive the noblest of all sentiments—patriotism. This makes a St. Patrick's Day dance one of the most popular of the year, and last night's was no exception to this. The room was decorated in a really artistic manner. Festoons of flags and streamers covered the walls, flowers, artificial and real, were abundant, and the electric lights were shaded by varied coloured screens. At the Southern end of the room, lit up by electricity, were the national emblems of the Harp and Shamrock, while at the other end was a coloured device worked by clockwork. The effect of the whole was most pleasant and evoked general admiration. A delightful feature of the evening was the presentation to each lady on her arrival of a sprig of real Irish shamrock. These sprigs had been specially obtained from Ireland and will, no doubt, be treasured by the recipients as souvenirs.

"'A large number of Officers and ladies attended, and among others were Colonel Faunce, Colonel Johnson. R.A.M.C.. Deputy-Inspector-General Lilly, of the Royal Naval Hospital, and members of his Staff.

"'Dancing commenced with the Grand March Lancers, led by Colonel Faunce and Mrs. Dudman, wife of the President of the Committee. Serjeant-Major Dudman, the President, with Mrs. Faunce followed, and a large number of dancers lined up. From start to finish dancing was kept up with a true Irish swing and everybody was sorry when the Irish Quadrilles brought the evening to a close. To the unsophisticated the term "Irish Quadrilles" means little, but to those who danced them the term means a lot. They call for every ounce of energy one possesses, but provide good fun.

"'The catering arrangements were in the hands of Messrs. Risso and were excellent. The idea of small tables, at each of which four or five persons could be seated, removed any tendency to formality and was a good idea.

"'The band of the Queen's Regiment provided the music and gave full satisfaction.

"'The Royal Army Medical Corps must be congratulated on the result of their Committee's work and surely Serjeant-Major Dudman, Staff-Quartermaster-Serjeant Grant, and their colleagues have every ground to be proud of having organised one of the best of this year's dances.'

In football the Company have played much better than in former years. This year a Cup was given for Inter-Company Competition on the Rock, and every Company of every Corp had a shot at it. We were delighted to get into the final and were greatly disappointed at not winning. E Company of the Norfolk Regiment beat us 3 goals to nil. As will be seen from the report of the match in the *Gibraltar Chronicle* which I send you, we had no luck, but as that paper says, "The Corps did not play in their usual good form." We hope for better fortune next year.

Boxing is a very favourite sport here. On March 27 there was a great tournament and Corporal Dover, Royal Army Medical Corps, fought Leading-Stoker Bain, R.N., for the featherweight championship. Corporal Dover was the favourite for the event, but in the fourth round he severely injured his left wrist and forearm. Although only able to use one arm he fought out the round and then, very wisely, withdrew.

"The Annual Mobilisation of the Fortress ended on Monday last, and the leave season now begins.

"As I conclude these notes the bells are tolling for the death of the Roman Catholic Bishop, Dom Guido Barbeiri, a familiar figure in Gibraltar and well known to many officers of the Corps.

"GARRISON FOOTBALL ASSOCIATION.

"Garrison Inter-Company Competition.—The Final.

"*E Company, Norfolk Regiment* v. *No.* 28 *Company Royal Army Medical Corp.*

"Yesterday would have been an ideal day for a cricket match for it was quite hot at North Front. Happily for the spectators a slight breeze was blowing from the West which made it quite pleasant.

"A fairly good number surrounded the League Ground to see this final. The following represented their Units:

"E Company Norfolk Regiment.—Serjeant Lattimore; Lance-Corporal Dowse, Quartermaster-Serjeant Semmance; Corporal Tacon, Private Todd, Private Johnson; Lance-Corporal Dermott, Private Watts, Private Green, Private Jermy, Private Graver.

"Royal Army Medical Corps; Private Salter; Private Vincent, Private Wilkinson;

Lance-Corporal Ryan, Private Hahner, Corporal Duerdon, Private Coles. Private Bowder, Lance-Corporal Whyatt, Private Whiddon, Private Marsh.

"Referee: Corporal Snook, R. A. South.

"Linesmen: Serjeant Dempster, R.E., and Corporal Bullimore, R.A., North.

"E Company having obtained choice of ground selected to play defending the Rock goal. The Corps did not play in their usual good form, they were decidedly off. They commenced excitedly and at times played most erratically. In the first few seconds they made a beautiful opening, but a foul against them shattered their opportunity. From the kick the Infantry got away and did not stop till Graver had found the net, thus opening the score. Shout for 'E' went up from the crowd. The Corps proceeded off with another rush, though again the move was plucked by off-side. E Company meant to get another point to make it a sure thing and worried their opponents' defence; the backs, however, eventually cleared the danger. The left wing taking the ball up the field centred it, but there was no one up to complete the attack; the result was that Salter had to save from the return visit. A foul against the Corps gave E Company a shot, a corner following from it. Bowden collided with an opponent and went down, the game having to be suspended for a while. Immediately after resuming play Whiddon ran up and delivered a long shot. Lattimore, however, was prepared and put the ball to his backs; the Corps succeeded in robbing them, but again off-side frustrated their movement. The Corps managed to secure the ball and steal away. Their passing was the finest bit of work for the afternoon; it really looked as though they had got settled down, but their supporters were soon undeceived for they returned to their former erratic play. Whyatt completed the fine piece of work by putting in a beauty bringing Lattimore to ground, the ball had landed against his stomach. Again, the Corps looked dangerous, for they were hanging around the Holy Boys' defence, but they simply could not break through. The Infantry took the play into the Corps area and kept it there for a long time, at last getting well upon the goal, when Duerdon, to the delight of the spectators, cleared the field and the ball as well. Still E Company quickly returned and Green found the net amidst shouts for 'E'; Salter had no chance whatever to stop the ball. A foul against the Infantry altered the play temporarily, but they soon began to worry the Corps until Salter conceded a corner in order to save. Another foul against E Company once more put the Corps forward, but again wild play deprived them and the Holy Boys made another charge, getting a corner. The kick was nicely placed, and the ball secured by the right players; the Corps, however, kept them off and got away into midfield, where they lost the ball. Salter sharply observed what was to be done and ran out and saved splendidly, the crowd showing appreciation of his smartness.

"Half-time E Company Norfolks 2—0.

"The Corps kicked off with the wind to their favour, also the sun behind them, which thus gave their supporters hopes; the result however proved to the contrary. As in the first half they quickly got a splendid opening which they failed to turn to advantage. Again returning Marsh dealt a shot, but Lattimore disposed of it, as also he did one from Coles, A foul against E Company brought the Corps in front of their goal with a nice header; Lattimore, however, was not to be beaten. Offside and a foul followed against the Corps, then Dermott getting possession of the ball took aim and sent in an unmistakable scoring shot. Loud applause was given by the supporters of E Company. Salter could not possibly have stopped its entering. E Company made away again, off-side bringing them up, and the Corps was enabled to return. Lattimore dealt with the shot with his fists, but the rebound was captured by the corps who specially dealt him another, which he did not fail to secure, and his side got away, calling upon Salter to defend. A foul against Infantry opened up for the Corps, the ball subsequently going behind. Once again the Holy Boys attacked their opponents' defence and Salter made a couple of fine saves. Lattimore, seeing the Corps making an advance, ran a long way out and caused them to turn about, so that Salter had a similar thing to do; he, however, missed the ball, thus placing his goal in danger, though luckily the backs succeeded in saving. From a kick for a foul against the Infantry the Corps got a corner, but the ball was kicked behind. Off-side spoilt two attacks made by the Corps, a further attack was made and Whiddon had a try, but nothing could pass Lattimore. Each side had a corner and Salter made a couple of good saves which brought the game to a finish, E Company winning by 3 goals to nil.

"After the game Major Banks, A.O.D., addressed the winners, informing them that they had won a Cup the value of £20, which was being given by the Garrison Recreation Rooms. The team called for three cheers for Major Banks as he departed."

NOTES FROM WYNBERG.—Lieutenant and Quartermaster C. W. Kinsella writes: "Thanks to the kindness of Colonel Robinson, A.M.O., Lieutenant-Colonel Hickson and officers, the married families spent an enjoyable afternoon recently in Wynberg Park, most of the officers and ladies being present. High tea was served in the charming grounds, and races, &c., for both young and old helped to fill in a pleasant programme. The Christmas toys for the children and presents for the mothers were kindly distributed by Mrs. Hickson, to whom, with Mrs. Connolly and Mrs. Kinsella, who made the necessary selections, three hearty cheers were accorded.

"We are on the eve of many changes. Lieutenant-Colonel Caldwell proceeds to Pretoria as S.S.O. in exchange with Major McNaught. Major Forde and Captain Ievers join from Pretoria, and Serjeant-Major Escott from the office of the Principal Medical Officer, South Africa, relieves Lieutenant Kinsella, who proceeds home on promotion to His Majesty's Commission.

"The 'Soudan,' sailing from Cape Town, takes this officer and several N.C.O.s tour-expired from the company."

FROM THE CAPE TO SOUTHAMPTON.—Lieutenant and Quartermaster C. W. Kinsella writes: "The H.T. 'Soudan' sailed from Cape Town on March 15, having on board Lieutenant-Colonel Duncan, Major McMunn, Captains Dunkerton and McConaghy, and Quartermasters Captain Spackmann, Lieutenants Osborne and Kinsella, with twenty-two N.C.O.s and men, Royal Army Medical Corps, also Matron Miss Cox and Miss Merritt, daughter of Major and Quartermaster Merritt.

"Colonel W. C. G. Heneker, D.S.O., A.D.C., was in command of the troops, which comprised drafts and time-expired details of various regiments and corps.

"Fair weather favoured the three weeks voyage, and the monotony was broken by the various forms of amusements.

"The daily 'sweep' on the run was well supported, and the Corps' representatives annexed a fair share of the spoils. In the large sweep on the Grand National Captain Dunkerton was the lucky winner of the second.

"Concerts were held weekly, to which Miss Merritt and Lieutenant Kinsella contributed successfully, and a tug-of-war, Subalterns *v.* the Rest, ended in a win for the latter, who were much the weighter team.

"Sports for the troops filled in a pleasant two days' interlude.

"Las Palmas was reached on March 20, but, owing to quarantine, landing was debarred—the bumboatmen reaping a rich harvest in consequence.

"Southampton was reached on April 5, the inevitable leave takings being heartened by many good wishes."

NOTES FROM BLOEMFONTEIN.—(Extract from the *Friend*): "On Wednesday night a smoking concert took place at the Queen's Hotel, as a farewell to Captain Spackman of the Royal Army Medical Corps.

"Dr. Usmar presided over a large company interested in ambulance work.

"During the first part of the evening comic songs were given by Mr. Arthur Kelly, who is a great favourite at local concerts, and the aria 'Alice, where art thou?' and several others were artistically rendered by members of the Cameronians, who had a great reception. Mr. F. Elliott was in good voice in 'Normana,' and in response to an encore sang 'Border Ballads' very sweetly. Quartermaster Rice gave two recitations, which were well received. The pipers of the Cameronians played some stirring Scottish airs, which was followed by some excellent step dancing by a member of the same regiment.

"CHAIRMAN'S REMARKS.

"The chairman, in proposing the health of the guest of the evening, said that Captain Spackman had been engaged in ambulance work for thirteen years, six of which had been spent in Bloemfontein. All those who had worked with him and under him deeply regretted his departure, as his whole heart and soul had been in the work. The feelings of those who knew what he had done would take some practical shape in the near feature. The speaker then referred at length to the value—yes, the absolute necessity—of first aid, referring to what had been done by the Grey College and the police in this direction. Captain Spackman had been the organiser of the various ambulance brigades in Bloemfontein, and, as showing that he had been loyally supported by Lieutenant-Colonel du Toit, it might be mentioned that there was not a member of the police force in Bloemfontein who did not hold a certificate.

"Mr. Underwood, in a neat speech, proposed the health of Lieutenant-Colonel du Toit and Mr. W. Olds, who had been of great assistance in the ambulance move-

ment, and also welcomed Lieutenant Clapshaw, who would succeed Captain Spackman.

"CAPTAIN SPACKMAN'S REPLY.

"Captain Spackman was received with loud and prolonged cheering on rising to reply. He thanked those present for the hearty manner in which the toast of his health had been proposed and received. After reviewing the progress which ambulance work had made in Bloemfontein since he first started it in 1902, he said he was an enthusiast in the work. No man should be unable to render first aid, which was often required in the absence of a medical man in case of accident. Surely it was noble to be in a position to save a fellow-man's life, and he hoped the present brigade would continue to flourish and increase in numbers. He regretted being compelled to leave Bloemfontein. He was now going home, at the call of duty, but he liked South Africa, and after a year's absence he hoped to be back amongst them.

"COMMISSIONER OF POLICE.

"Lieutenant-Colonel du Toit said the police were renowned for being bad speakers, and he was no exception to the rule. He deeply regretted that Captain Spackman was leaving, as his guiding spirit would be much missed in the ambulance brigades. As a Boer, who was proud of having served in the Transvaal 'Staats Artillerie' before and during the war, he would give some of his reasons for advocating the necessity of first aid and why he had a particular admiration for the Royal Army Medical Corps. It was just during an eight hours' engagement in Natal that he was wounded so severely that he lost consciousness. On recovery he enquired what had happened and was told by a young man in khaki, with the letters R.A.M.C. on his arm, that he had been very ill. It turned out that had it not been for the presence of this young man he would have bled to death. He did not then know the meaning of the letters R.A.M.C., but he had reason to be grateful to one of its members for the careful attention received and for his knowledge in first aid. Mr. du Toit then spoke of the many valuable lives which had been lost during the war owing to there being no one able to render assistance to wounded comrades, who often bled to death on the veld when their lives could have been saved with a knowledge of first aid. There would never again be a war between the white people of this country, but every man should be prepared to lend assistance to his fellow-man when needed. Every man in this country, said Lieutenant-Colonel du Toit, should be able to render first aid.

"Mr. W. Olds said he had done but little towards ambulance work, but after what he had heard that night he would endeavour to do more.

"Lieutenant Clapshaw said he would do his utmost to fill the vacancy caused by the departure of Captain Spackman.

"Song and sentiment continued up to 11 o'clock, when the company dispersed.

"Mr. Percy Smith kindly gave his valuable services as accompanist, and Mr. Chaplin kept things going as M.C."

NOTES FROM CALCUTTA.—Lieutenant-Colonel R. S. F. Henderson, R.A.M.C., Secretary to the Principal Medical Officer, H.M.'s Forces in India, writes as follows, dated March 17, 1910:—

"*Appointments.*—The following officers are appointed to the command of station hospitals mentioned: Lieutenant-Colonel J. Meek, Quetta; Major J. W. Bullen, Wellington; Major H. I. Pocock, Nowshera.

"*Invalids.*—The Government of India have sanctioned the permanent adoption of the scheme, which was introduced as an experimental measure in 1907, of sending invalids to selected hill stations in India during the winter months instead of sending them to England.

NOTES FROM POONA.—Captain W. C. Smales writes:—The following officers have arrived for duty during the trooping season:—

"Lieutenant-Colonel R. H. Penton, D.S.O., S.M.O., Officer Commanding Station Hospital, Poona.

"Major Browne-Mason, Officer Commanding Section Hospital, Ghorpari.

"Captain H. Simson for duty at Ahmednagar.

"Lieutenants Houston, O'Brien, Butler, M. P. Leahy, W. Dunn, and Byatt.

"Lieutenants Byatt and Harding have been transferred as Officer Commanding Station Hospitals, Khandalla and Purandhar.

"*Departures.*—Lieutenant-Colonel H. S. McGill, having completed three years as

Officer Commanding Station Hospital, has been transferred in the same capacity to Secunderabad.

"Lieutenant-Colonel J. Meek, having completed his period as Sanitary Officer, 6th Poona Division, has been transferred to Quetta for temporary duty.

"Captain F. H. Noke left for England on March 11 by the "Plassy," tour expired.

"POONA AND KIRKEE REGATTA.

"The Forty-second Annual Regatta of the Royal Connaught Boat Club has just ended in a blaze of triumph for the Royal Army Medical Corps at Poona.

"Outside the single sculling events and the championship fours for Station crews, the chief events are the Oxenham pairs, Senior and Junior Regimental fours and Regimental eights.

"In the latter the Royal Army Medical Corps and Indian Medical Service are allowed to combine forces, and the Royal Army Medical Corps crews were entered for the three former, but, owing to an accident to one of the members of the Junior Four, they were unable to row together at all, and the entry was cancelled. The preliminary heats were rowed on the 21st, and our representatives at once showed that they were on their mettle.

"Turner and Leahy were the first to open the ball by winning their heat in the pairs, against the holders, by four lengths in the good time of 3 minutes and 23 seconds, over the half mile course.

"The next to distinguish themselves were the eight who rowed a splendid race with the gunners. It was a great race throughout, in which there was never more than a quarter of a length between the two boats, and after a desperate finish-all of the last quarter mile, we managed to snatch the verdict by 1 foot. Time: ¾ mile, 4 minutes and 17 seconds.

"The next day showed the Corps in great form. In the final of the Oxenham pairs, our stalwart pair (Turner and Leahy) rowing well with themselves made light of the task, and led from the start, winning comfortably by two lengths in 3 minutes and 27 seconds.

"The regimental four, Noke, Turner, Byatt, and Leahy, admirably coxed by Miss Dorothy Sloggett, repeated the performance, winning from the Sappers by two lengths in 4 minutes and 40 seconds, over ¾ mile. They were never extended, and in the opinion of many good judges would have opened the eyes of the Station four if Leahy could have performed the miracle of rowing in two boats at the same time, as they were, undoubtedly, the prettiest crew on the river during the regatta for dash, time, and swing.

"Between these two races the mixed Canadian canoe race was won by the Royal Army Medical Corps, Captain Smales and Lieutenant Turner, an event of which the performance fully justified our confident expectations. Byatt, too, added another laurel leaf by stroking a scratch crew over ½ of a mile, and after one of the crew had started by catching a crab, he brought them in so smartly that they got home by a yard.

"The last day of the regatta saw Leahy keeping up his list of victories by rowing bow in the Poona four, which beat crews from Madras and Bombay by two lengths over the mile course, in itself a good day's work for an ordinary mortal.

"The final of the eights was a fitting wind-up to our programme, our crews had all been fancied for the previous events owing to their good form during the practices; but many causes had combined rather to militate against the eight getting together, sickness and the exigencies of the Service had both hit us rather heavily, and the local rag, in discussing the chances a week before the race, had not unjustly likened us to the 'curate's egg.' The Sappers, on the other hand, were well together, and were generally considered the favourites. However, the old adage 'Nothing succeeds like success' had borne fruit, and we went down to the start with a fair allowance of confidence. The boat got away well from the start at a reputed rate of 40, and steadily drew clear, leading three-quarters of a length at the end of ¼ mile; at the end of the next quarter we were well clear, and Miss Sloggett was giving our opponents the benefit of our wash. Our stroke never gave them the chance of getting up, and we finished a length and a quarter to the good, having knocked six seconds off our previous best time.

"Crew: Smales, Humphry, Cruickshank, Leahy, Byatt, Turner, Noke. Cox: Miss Dorothy Sloggett.

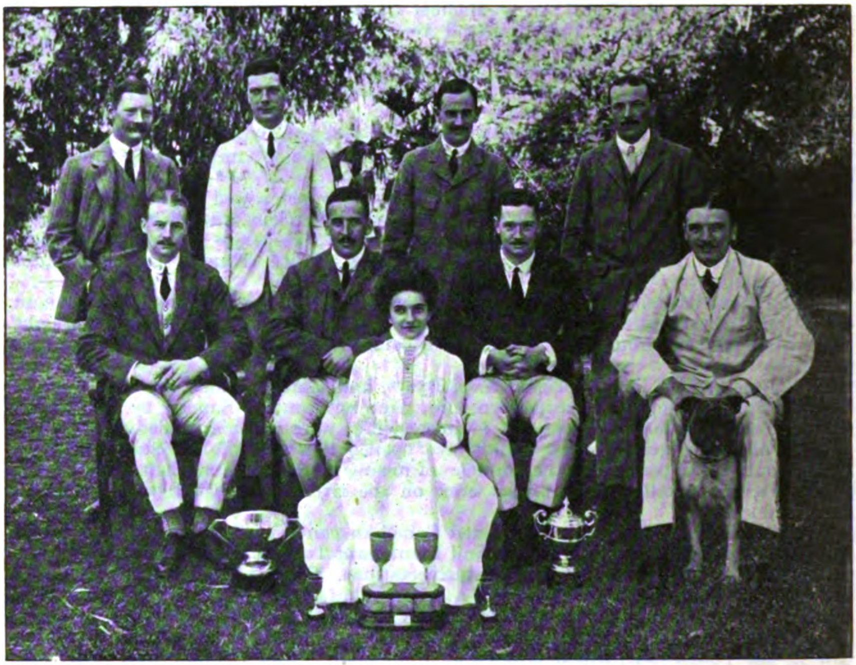
"We were exceedingly fortunate to have four oarsmen of the class of our senior four in the Station at one time, but it would be difficult to appreciate too highly our indebtedness to our pluckly stroke, Captain Noke. His tact and energy took us through some very troubled waters during the practices, and it was particularly hard lines on

him that a most inopportune bout of fever prevented him earning the winning brackets in the senior sculls, fn addition to stroking two winning crews.

"Miss Dorothy Sloggett, too, deserves all praise, as she was competing against two well-known Poona lady coxes, and came out of her ordeal with flying colours, steering all her races with great skill and coolness.

"It has been decided to present the cup won by the Eight to the Royal Army Medical Corps mess at Millbank.

"The cup won by the Fours has been presented to our Principal Medical Officer, Surgeon-General A. T. Sloggett, C.M.G., on account of the great interest he took in our rowing."



Major H. O. B. Browne-Mason. Capt. J. A. Cruickshank. Capt. L. Humphry. Capt. W. C. Smales.
Lieut. H. V. B. Byatt. Capt. F. H. Noke. Lieut. F. T. Turner. Lieut. M. P. Leahy.
Miss D. C. Sloggett.

SPECIAL RESERVE OF OFFICERS, ROYAL ARMY MEDICAL CORPS.

Lieutenant Charles V. Nicoll, from the Army Medical Reserve, to be Lieutenant, retaining the rank and seniority which he held in the Army Medical Reserve, dated February 28, 1910.

George Frederick Randall to be Lieutenant (on probation), dated February 11, 1910.

Charles Max Page, M.B., to be Lieutenant (on probation), dated March 14, 1910.

ARMY MEDICAL RESERVE.

Lieutenant Archibald C. Adams resigns his commission, dated February 28, 1910.

TERRITORIAL FORCE.

Royal Army Medical Corps.

For attachment to Units other than Medical Units.

Donald John Armour, F.R.C.S.(Eng.), to be Lieutenant, dated February 1, 1910.

Captain John Forbes, M.B., from the 1st London (City of London) Field Ambulance, Royal Army Medical Corps, to be Captain, dated February 2, 1910.

1st *Welsh Field Ambulance.*—Serjeant Edwin Bull to be Quartermaster, with the honorary rank of Lieutenant, dated March 19, 1910.

3rd *Northern General Hospital.*—Captain Archibald Young, M.B., to be Major, dated April 18, 1909.

Major Archibald Young, M.B,, resigns his commission, dated November 20, 1909.

Captain Arthur R. Hallam, M.D., to be Major, dated November 20, 1909.

For attachment to Units other than Medical Units.

Lieutenant Albert Willis Warren Swettenham, from the South Wales Mounted Brigade Field Ambulance, Royal Army Medical Corps, to be Lieutenant, dated January 1, 1910.

1st *Welsh (Howitzer) Brigade.*—Surgeon-Captain David A. Davis, M.B., to be Surgeon-Major, dated July 1, 1909.

ROYAL ARMY MEDICAL CORPS.

3rd *Lowland Field Ambulance.*—Lieutenant William K. Macdonald, M.B., resigns his commission, dated February 8, 1910.

James Young, M.B., F.R.C.S.(Edin.), to be Lieutenant, dated February 8, 1910.

1st *Welsh Field Ambulance.*—Edmund Victor Connellan to be Lieutenant, dated February 1, 1910.

3rd *Welsh Field Ambulance.*—Captain George Arbour Stephens, M.D., to be Major, dated September 2, 1908.

For attachment to Units other than Medical Units.

Ernest Augustus Boxer to be Lieutenant, dated November 24, 1909.

Frederic Reginald Sutton, M.D., to be Lieutenant, dated January 14, 1910.

Henry Halton, M.D. (late Surgeon-Captain, 1st Lancashire Royal Engineers, (Volunteers), to be Captain, dated February 1, 1910.

John Bart Rous to be Lieutenant, dated February 8, 1910.

ROYAL ARMY MEDICAL CORPS.

1st *London (City of London) Field Ambulance.*—Duncan Campbell Lloyd Fitz-williams, M.D., F.R.C.S. (Eng. and Edin.), to be Lieutenant, dated January 3, 1910.

3rd *Wessex Brigade.*—Surgeon-Lieutenant Colonel Augustus Kinsey-Morgan resigns his commission, and is granted permission to retain his rank, and to wear the prescribed uniform, dated February 21, 1910.

4th *Battalion, The Oxfordshire and Buckinghamshire Light Infantry.*—Surgeon-Lieutenant Hubert de B. Dwyer, to be Surgeon-Captain, dated February 3, 1910.

ROYAL ARMY MEDICAL CORPS.

1st *Home Counties Field Ambulance.*—Lieutenant Joseph Ward to be Captain, dated February 1, 1910.

For attachment to Units other than Medical Units.

Hugh Davies, M.B., F.R.C.S.(Eng.), to be Lieutenant, dated December 11, 1909.

Charles Percy Woodstock to be Lieutenant, dated January 1, 1910.

William Robert Wilson to be Lieutenant, dated January 10, 1910.

Westmorland and Cumberland.—Surgeon-Major Joseph E. Bowser, M.B., resigns his commission, and is granted permission to retain his rank and to wear the prescribed uniform, dated February 22, 1910.

Captain Oswald A. Critchley resigns his commission, dated March 10, 1910.

7th *Battalion, The Manchester Regiment.* — Surgeon-Lieutenant (Captain and Honorary Major) (Volunteers) John C. Nichol, M.D., resigns his commission, and is granted permission to retain his rank and to wear the prescribed uniform, dated January 31, 1910.

ROYAL ARMY MEDICAL CORPS.

1st *South Western Mounted Brigade Field Ambulance.*—Robert Pounden Beatty, M.D., to be lieutenant, dated February 15, 1910.

1st *West Riding Field Ambulance.*—Lieutenant Alexander B. S. Stewart to be Captain, dated February 15, 1910.

2nd *London (City of London) General Hospital.*—Hugh Mallinson Rigby, M.B., F.R.C.S.(Eng.), to be Captain, whose services will be available on mobilisation, dated March 19, 1910.

For attachment to Units other than Medical Units.

James Leonard Joyce to be Lieutenant, dated January 5, 1910.

James Mathieson Kirkness, M.B., to be Lieutenant, dated February 1, 1910.

Stanley Fox Linton, M.B., to be Lieutenant, dated February 9, 1910.

Frederick William Sydenham, M.D., F.R.C.S.(Edin.), to be Lieutenant, dated February 11, 1910.

Attached to Units other than Medical Units.

Lieutenant David Westwood, M.B., to be Captain, dated January 28, 1910.

Captain Alexander Roxburgh, M.D., resigns his commission, dated February 22, 1910.

QUEEN ALEXANDRA'S IMPERIAL MILITARY NURSING SERVICE.

Postings and Transfers.—Matrons: Miss E. J. Martin, R.R.C., to London, S.W., from Connaught Hospital, Aldershot; Miss E. A. Cox, to Connaught Hospital. Aldershot, from Tidworth; Miss A. A. Murphy, to Wynberg, on arrival in South Africa. Sisters: Miss E. C. Stewart, to Cambridge Hospital, Aldershot, from South Africa; Miss M. Mark, to Woolwich, from duty on T. S. "Plassy"; Miss A. F. Byers, to Dublin, from duty on T.S. "Plassy"; Miss L. E. C. Steen, to Tidworth, from Netley; Miss K. Pearse, to Bloemfontein, from Wynberg; Miss H. L. A. Jack, to Pretoria, on arrival in South Africa; Miss M. Smith, to Wynberg, on arrival in South Africa. Staff-Nurses: Miss I. J. Pooley, to Cairo, on arrival in Egypt; Miss M. E. Smith, to Woolwich, from duty on T.S. "Plassy"; Miss G. H. C. Paynter, to Devonport, from duty on T.S. "Plassy"; Miss V, L. Batteson, to Potchefstroom, on arrival in South Africa; Miss A. R. Sibbald, to Wynberg, on arrival in South Africa; Miss C. V. S. Johnson, to Pretoria, on arrival in South Africa; Miss M. H. Congleton, to Bloemfontein, on arrival in South Africa; Miss V. C. Paschali, to Wynberg, on arrival in South Africa.

Arrivals.—Miss E. C. Stewart, Sister, from South Africa; Miss E. C. Cheetham, Sister, from South Africa; Miss M. Wright, Sister, from South Africa.

Appointments Confirmed.—Staff Nurses: Miss K. J. Stewart, Miss C. M. Roy.

ARMY MEDICAL OFFICERS' WIDOWS AND ORPHANS FUND.

THE Annual General Meeting, and a Special General Meeting following, of the above Society will be held on Wednesday, May 18th, at 2.30 p.m., in the theatre of the Royal United Service Institution, Whitehall, S.W. The Chair will be taken by Deputy-Surgeon-General W. G. Don, M.D., Vice-President.

AGENDA.

(1) Minutes of the last General Meeting to be read and confirmed.

(2) (*a*) To elect a President, *vice* Surgeon-General Sir Alfred Keogh, K.C.B., resigned; for which the Committee nominate Surgeon-General W. L. Gubbins, C.B., M.V.O., K.H.S., Director-General.

(*b*) To elect an additional Vice-President, for which the Committee nominate Surgeon-General W. S. M. Price.

(*c*) To elect a Trustee, *vice* Deputy-Surgeon-General C. A. Innes resigned, for which the Committee nominate Lieutenant-Colonel A. F. S. Clarke, M.D.

(3) To confirm the election by the Committee as members thereof, under Rule XXVI. of Colonel D. Wardrop, C.V.O., M.B., and of Major C. E. Pollock.

(4) To elect two members of Committee in place of those appointed Vice-President and Trustee.

(5) To approve the Annual General Report and Statement of Accounts.

(6) To appoint auditors for 1910.

SPECIAL GENERAL MEETING.

To submit and rectify in accordance with Rule XLIX, the following amendment to Rule X. defining the term "members" used therein, which has been drafted by the legal advisers and approved by the Actuary of the Society.

RULE X.

If the Report of the Actuary, at any quinquennial valuation of the Assets and Liabilities of the Society, shows, at the valuation date, after provision for all con-

tingencies, a surplus which in the opinion of the Committee, and upon the advice of the Actuary, may be safely distributed, this surplus shall be applicable for the benefit of Members in such manner as the Committee of Management, upon the advice of the Actuary, may determine.

RULE X. (PROPOSED).

If it shall appear from the Report of the Actuary, appointed as Valuer under Rule XLVI. on his quinquennial valuation of the Assets and Liabilities of the Society made under the provision of these Rules, that there was at the date thereof a surplus, after making provision for meeting all claims and contingencies, such part of such surplus as the Actuary advises can safely be distributed may, on the recommendation of the Committee, be applied in such manner for the benefit of the members, or their widows or orphan children, as the members in General Meeting, in accordance with the advice of the Actuary, may from time to time determine.

(NOTE.—The term "Members" as the Rule now stands does not connote widows and orphans, and without such amendment they might not participate in the division of any surplus funds which the Actuary might declare available at the quinquennial valuation of the assets of the Society.)

ROYAL ARMY MEDICAL CORPS FUND.

PROCEEDINGS OF A COMMITTEE MEETING HELD AT THE WAR OFFICE ON MONDAY, APRIL 18, 1910, AT 2.30 P.M.

Present.

Surgeon-General W. L. Gubbins, C.B., M.V.O., Chairman, in the Chair.
Surgeon-General W. Donovan, C.B.
Colonel D. Wardrop, C.V.O.
Colonel A. Peterkin.
Colonel H. E. James.
Lieutenant-Colonel E. M. Wilson, C.B., C.M.G., D.S.O.
Lieutenant-Colonel E. O. Wight.
Major E. T. F. Birrill.

(1) The Minutes of the last meeting were read and confirmed.

(2) Surgeon-General W. Donovan, C.B., took his seat on the Committee as a representative of retired officers, *vice* Lieutenant-Colonel Charlesworth, C.M.G.

3) The Aldershot Band accounts were considered and passed, and are attached to the proceedings. The question of giving extra pay to experienced bandsmen was discussed, and it was resolved that sixpence a day extra pay might be given to not more than six men. A sum of £110 was voted for the current quarter's expenses.

(4) The expenditure from the General Relief Fund was confirmed and a list of the recipients for the past quarter are appended to these minutes. The Committee noted that 10s. had been expended from the Aldershot Imprest account, and £1 18s. 5d. from that of London. The Committee considered a special case of giving a sum of £10 to enable an applicant to start a shop, and decided that it be not granted. An extra £3 was sanctioned as a special case for Mrs. E. M. W.

(5) It was noted that the following grants have been received from Companies for the General Relief Fund for the past quarter:—

R.A.M.C. Fund for 1909	£10	0	0
No. 4 Company, Netley	5	0	0
,, 7 ,, Devonport	6	10	0
,, 12 ,, Woolwich	2	10	0
,, 15 ,, Belfast	5	17	0
,, 20 ,, Tidworth	1	10	0
,, 26 ,, Ceylon	5	0	0
Standerton, Sale of Huts	62	9	8
Total	£98	16	8

(6) It was noted that the Wolseley Memorial Brass has been moved to the Chapel at Netley, at a cost of £2 19s. 1d., and £50 had been paid for laying out the ground around the McGrigor Statue.

(7) It was proposed by Surgeon-General Donovan, seconded by Lieutenant-Colonel E. M. Wilson, and carried unanimously, that a sum of £80 be voted for painting the portrait of the Director-General, and that the Memorial sub-Committee be asked to take steps to have this done.

(8) The report of the Dinner sub-Committee was read, considered, and passed, and is attached to these proceedings.

(9) A letter was read from the Chelsea Commissioners regarding giving regimental aid to those pensioners wishing to commute their pensions; it was resolved that no action be taken in the matter.

(10) The adjourned discussion on the re-constitution of the Committee was resumed. It was proposed by the Chairman, seconded by Surgeon General Donovan, and carried, *nem. con.*: "That in future the Band President be an ex-officio member of the Committee, also that an officer below field rank, who is a dining member of the Mess, Aldershot, be nominated by the Principal Medical Officer of that place, to represent the junior Officers of the Corps." The composition of the Committee will, in future, be as follows:—

(1) The Director-General.
(2) The Deputy-Director-General.
(3) Commandant College.
(4) Principal Medical Officer, London.
(5) Staff Officer, Royal Army Medical Corps.
(6) A Professor at the College.
(7) The Band President.
(8) Junior Officer, Aldershot.
(9) Quartermaster, Medical Stores, Woolwich.
(10)
(11)
(12)
(13) } Four representatives of Retired Officers, elected for four years.

(11) It having been reported to the meeting that Surgeon-General Sir Alfred Keogh, K.C.B., wished to resign his trusteeship of the Royal Army Medical Corps Fund, and that Surgeon-General W. Donovan, of the Army and Navy Club, was willing to be appointed a trustee in his place, Surgeon-General W. L. Gubbins proposed the following resolutions:—

That Sir Alfred Keogh's resignation from the trusteeship of the settlement, dated May 6, 1908, of the Royal Army Medical Corps Fund, be accepted, and that Surgeon-General W. Donovan, C.B., be nominated a trustee in his place, to act jointly with the continuing trustees, Mr. Vesey George Mackenzie Holt and Colonel Douglas Wardrop, and that such continuing trustees be requested to proceed with the appointment of Surgeon-General W. Donovan, C.B., accordingly. This was seconded by Lieutenant-Colonel E. M. Wilson, and carried unanimously.

(12) It was resolved to ask the Principal Medical Officer of Ireland if he considered it advisable to continue the subscription of £5 yearly to the Drummond Institution.

(13) It was proposed by the Chairman, seconded by Lieutenant-Colonel E. M. Wilson, and resolved that the following be appointed a Sub-Committee to consider the question of an Office allowance, together with remuneration of the Secretary, and to make their recommendations to the next meeting: Colonel A. Peterkin, Lieutenant-Colonel E. M. Wilson, C.B., C.M.G., D.S.O., Major E. P. F. Birrell.

F. W. H. Davie Harris, *Lieutenant-Colonel,*
Secretary.

ROYAL ARMY MEDICAL CORPS BAND ACCOUNTS.

BALANCE SHEET FOR THE QUARTER ENDING MARCH 31, 1910.

RECEIPTS.

	£	s.	d.
Recovered for sums advanced to Band for Fares, Gratuities, &c.	12	7	8
Officers' (Aldershot) Subscriptions	17	17	6
Quarterly Grant	81	0	0
Three Officers' Separate Subscriptions	0	15	0
	£112	0	2

EXPENDITURE.

	£	s.	d.
Balance Debtor	11	13	4
Band Pay	35	1	0
Bandmaster's Salary	30	0	0
Advanced to Band for Fares and Gratuities (to be recovered)	13	4	6
Expenses connected with concert	2	2	0
,, ,, ,, lost violin	0	10	0
Postage	0	4	8
Small Repairs	0	1	1
Master Tailor, altering Tunics	2	11	5
Hawkes and Son, Music and Repairs	10	0	4
Boosey and Co. ,, ,, ,,	2	4	1
Gale and Polden, Band Programmes	1	0	0
Balance Credit	3	7	10
	£112	0	2

MAJOR W. STALLARD, R.A.M.C.,
Band President.

ROYAL ARMY MEDICAL CORPS FUND.

RECIPIENTS FROM THE GENERAL RELIEF FUND FOR THE QUARTER ENDING MARCH 31, 1910.

Name	Age	District	Grant	Total	Remarks
Mrs. A. B. ..	41	Dublin ..	£3	£25	Unable to get employment. Two children to support.
Mr. A. T. ..	48	Portsmouth	£1 10s.	£1 10s.	Destitute and out of work. Eight children to support.
Mrs. N. S. ..	69	London ..	£4	£52 10s.	Too old to work.
Mrs. E. M. W...	39	Aldershot..	10s.	£2	Paid by Lieut.-Colonel Wilson to enable her to take child to home.
Mr. A. T. ..	49	Netley ..	£3	£4 10s.	Destitute and out of work. Eight children to support.
Mr. T. H. ..	47	Chatham..	£4	£8	A cripple. Four children dependent upon him.
Mrs. E. M. W...	39	Aldershot..	£2 10s.	£4 10s.	Destitution. Four children to support.
Mr. S. L. ..	28	London ..	£1	£1	Destitute and out of work.
Mr. F. L. ..	39	Portsmouth	£4	£8	Ill-health and out of work. Six children to support.
Mrs. S. A. P. ..	53	,, ..	£1	£1	Incapacitated for work from ill-health.
Mr. W. G. ..	22	London ..	£4	£4	To assist him to take up employment in Canada.
Mr. F. G. R. ..	36	,, ..	£4	£4	Suffers from phthisis. Unable to work.

DINNER SUB-COMMITTEE.

REPORT FOR SUBMISSION TO THE GENERAL COMMITTEE ROYAL ARMY MEDICAL CORPS FUND.

(1) The Sub-Committee of the Dinner Fund report that Colonel A. Peterkin has been appointed Chairman of the Dinner Sub-Committee *vice* Surgeon-General W. L. Gubbins.

(2) That Major J. V. Forrest and Major E. W. W. Cochrane having proceeded for service abroad, Major H. A. Bray has been nominated to fill the vacancy caused by the departure of the first-named officer, and Captain F. S. Irvine in place of Major E. W. W. Cochrane.

(3) That the Dinner for 1909, held at the Trocadero Restaurant was considered satisfactory, and arrangements will be made for the Annual Dinner this year to be held in the same rooms on June 13, at 8 p.m.

(4) That the number of members who continued during the past year to subscribe to the old Dinner Fund was forty-one.

(5) That 233 past and present officers of the Corps dined on June 14 last. This is again an increase on any previous attendance.

(6) That they recommend that the charge for tickets to subscribers be 7s. 6d., and to non-subscribers 32s. 6d., a grant being voted from the Royal Army Medical Corps Fund to defray the balance.

(7) The Sub-Committee do not propose to make any arrangements for a photograph of the Dinner to be taken this year, and recommend that the question of having photographs taken in future years be referred to the Annual General Meeting of the Corps this year.

ROYAL ARMY MEDICAL CORPS DINNER FUND.

Balance Sheet and Statement of Accounts for the Year ending December 31, 1909.

Receipts.

1909.			£	s.	d.
Jan.	1.	To Balance brought forward, 1908	13	10	1
June	14.	,, Cash taken at doors, Trocadero	80	12	6
,,	14.	,, Cash, 1 Ticket	0	7	6
,,	22.	,, Cheque from Secretary R.A.M.C. Fund in Settlement of Account of Trocadero	268	17	6
July	1.	To Receipts by Bank (Holt & Co.)	19	15	0
		Total	£383	2	7

Expenditure.

1909.			£	s.	d.
June	14.	By Postage	1	9	5
,,	14.	,, Cash taken at Doors, Trocadero ..	80	12	6
,,	21.	,, Clerical Work	2	0	0
,,	22.	,, Cheque in Settlement of Account of Trocadero (from Secretary, R.A.M.C. Fund)	268	17	6
,,	22.	,, Carriage of Plate, R.A.M.C. Mess, Aldershot	2	0	7
,,	23.	R.A.M.C. College Mess	0	8	6
,,	24.	By Stationery, Printing, &c. (A. and N.C.S.)	3	9	9½
July	1.	,, Advertisement (May and Williams) ..	5	13	0
,,	1.	,, Band Expenses	1	10	6
,,	1.	,, Cash in hand	0	9	7½
,,	3.	,, Balance Credit (Holt & Co.) (*see* Pass Book)	16	11	2
		Total	£383	2	7

Receipts in possession of Secretary, R.A.M.C. Fund.
November **1, 1909.**

Audited and found correct.
(*Signed*) D. WARDROP, *Colonel*.

Proceedings of a Committee Meeting held at the War Office at 3.30 p.m., on Monday, April 18, 1910.

Present.

Surgeon-General W. L. Gubbins, C.B., M.V.O., President in the Chair.
Colonel D. Wardrop, M.V.O.
Colonel A. Peterkin.
Lieutenant-Colonel E. M. Wilson, C.B., C.M.G., D.S.O.
Major E. T. F. Birrell.

(1) The Minutes of the last Meeting were read and confirmed.

(2) The following special Grants made by the Secretary were approved and sanctioned:—

The orphan daughter of Surgeon-General T. B.	£5 0 0
The four orphan daughters of Captain W. J. C.	5 0 0

(3) It was resolved to nominate the following officers as Vice-Presidents for the ensuing year subject to their acceptance: Colonel J. Lane Notter; Surgeon-General W. Donovan, C.B.; Colonel Sir James Clark, C.B., Bart.

(4) It was resolved that Major C. E. Pollock and Lieutenant-Colonel A. M. Davis be appointed on the Committee *vice* Lieutenant-Colonel Firth and Major Horrocks.

(5) It was noted that a legacy of £100 free of legacy duty has been received from the late Surgeon-General Sir James Mouat on the death of Lady Mouat.

(6) The Committee carefully considered the application for grants and made the following recommendations for the sanction of the Annual General Meeting:—

Three orphan daughters of Staff-Surgeon D. O. D.	£40 0 0
Orphan daughter of Inspector-General R. D.	30 0 0
Two orphan sons of Surgeon-Major C. Q.	30 0 0
Orphan son of Surgeon-Major S. T. C. (last grant)	20 0 0
Orphan daughter of Surgeon-Major W. S. L. (last grant)	20 0 0
Orphan son of Surgeon-Lieutenant-Colonel R. W. T.	30 0 0
Orphan son of Brigade-Surgeon M. Q.	20 0 0
Orphan daughter of Surgeon-General J. F.	25 0 0
Orphan daughter of Inspector-General D. A.	30 0 0
And the McGrigor Pension	10 0 0
Two orphans of Lieutenant-Colonel H. W. A. M.	30 0 0
Four orphan daughters of the late Captain W. J. C.	40 0 0
Orphan daughter of Surgeon-General A. S.	10 0 0
Orphan daughter of Lieutenant-Colonel H. T. C.	20 0 0
Orphan daughter of Surgeon-General J. O.	25 0 0
Orphan daughter of Deputy-Inspector-General F. T. I.	30 0 0
Two orphans of the late Surgeon-Major W. P. F.	40 0 0
Orphan daughter of the late Surgeon-General T. B.	25 0 0
Orphan daughter of the late Surgeon-Major B. S.	25 0 0
Orphan daughter of the late Captain H. H. S.	20 0 0
Orphan daughter of Captain J. W. C.	20 0 0
Orphan son of Brigade-Surgeon J. W. H., under consideration.	
Orphan son of Major P. G. I.	30 0 0
Two orphan daughters of the late Surgeon-Major E. C. R. W., no grant.	
Orphan daughter of Assistant-Surgeon J. B. J., no grant.	

(7) On the proposal of the Chairman, seconded by Lieutenant-Colonel E. M. Wilson, C.B., C.M.G., D.S.O., it was resolved that the following be appointed a Sub-committee, to consider the question of an office grant, together with the remuneration of the Secretary, and to making their recommendations to the next meeting: Colonel A. Peterkin; Lieutenant-Colonel E. M. Wilson, C.B., C.M.G., D.S.O.; Major E. T. F. irrell.

Lieutenant-Colonel F. W. H. Davie Harris,
Secretary.

THE PARKES MEMORIAL PRIZE.

This prize, consisting of Seventy-Five Guineas and a Bronze Medal, is awarded every third year to the writer of the best essay on a subject connected with hygiene. The competition is open to the medical officers of the Royal Navy, Army, and Indian Services, of executive rank on full pay, with the exception of the Professors and Assistant Professors of the Royal Naval Hospital, Haslar, and the Royal Army Medical College, London, during their term of office. The subject for the next prize is the following: "The Causation and Prevention of Enteric Fever in Military Service, with Special Reference to one of the following Branches of the Subject: (*a*) The roll played by flies in the dissemination of the disease. (*b*) The importance of 'Carriers.' (*c*) The predisposing influence of age and length of Service." (Note.—The Essay must include the results of personal observation and research.) Essays to be sent in to the Secretary of the Prizes Committee, Royal Army Medical College, Millbank, London, on or before December 31, 1912. Each essay to have a motto, and to be accompanied with a sealed envelope bearing the same motto, and containing the name of the competitor. The successful essay becomes the property of the Prizes Committee.

UNITED SERVICES MEDICAL SOCIETY.

The next meeting of the above-named Society will be held at the Royal Army Medical College, Grosvenor Road, S.W., on Wednesday, May 11, 1910, at 4.30 p.m. Business: "Clinical Demonstrations."

ROYAL ARMY MEDICAL CORPS' ANNUAL DINNER, 1910.

The Annual Dinner of the Corps will take place on Monday, June 13, in the "Empire Rooms," Trocadero Restaurant, Piccadilly Circus, W., at 8 o'clock precisely, the Director-General in the Chair. *Officers intending to dine are requested to inform the Hon. Secretary as soon as possible*, in order that the probable number attending may be known and that tickets may be sent.

E. T. F. Birrell,
Major, Royal Army Medical Corps,
Hon. Sec. Sub-Committee, Royal Army Medical Corps Dinner Fund.

Ferndell,
Englefield Green, Surrey.

ARMY MEDICAL OFFICERS' BENEVOLENT SOCIETY.

The Annual General Meeting of the subscribers to the above Society will be held in the Theatre of the Royal United Service Institution at 3.30 p.m. on Monday, June 13. Those officers who wish for information on any special points are requested to communicate with the Secretary, Lieutenant-Colonel F. W. H. Davie Harris, St. George's Barracks, W.C., so that information may be furnished in response to any question asked.

F. W. H. Davie Harris,
Lieutenant-Colonel,
Secretary.

ROYAL ARMY MEDICAL CORPS FUND.

NOTICE OF THE EIGHTH ANNUAL GENERAL MEETING.

THE Eighth Annual General Meeting of Subscribers to this Fund will be held in the Theatre of the Royal United Service Institution at 2.30 p.m. on Monday, June 13, 1910. The Director-General will preside. It is hoped that officers will freely express their views on any point connected with the Fund. Those officers who may wish for information on any special point are requested to communicate with the Secretary at St, George's Barracks, W.C., so that information may be furnished in response to any question asked.

F. W. H. DAVIE HARRIS,
Lieutenant-Colonel,
Secretary.

"LARYNGOLOGY."

"An officer stationed near London, holding appointments at Throat Hospitals, has written to us that he would be very glad if he could be of service to any officer desirous of working up throat, nose, and ear diseases. He could meet them in London one afternoon weekly." Address: M. A. G., c/o Editor of the JOURNAL OF THE ROYAL ARMY MEDICAL CORPS.

BIRTHS.

BABBOUR.—On March 19, at Satara, near Poona, India, the wife of Captain J. H. Barbour, R.A.M.C., of a son.

ROBERTS.—On March 28, at Sliema, Malta, the wife of Captain F. E. Roberts, R.A.M.C., of a daughter.

PARKES.—April 1, at 29, Carlisle Terrace, Plymouth, the wife of Captain E. E. Parkes, R.A.M.C., of a son.

HYDE.—At Dublin on April 2, 1910, the wife of Captain D. O. Hyde, R.A.M.C., of a son.

DEATH.

BOULTON.—At 109, Queen's Gate, Kensington, on March 13, 1910, Honorary Brigade-Surgeon Edward Joseph Boulton, retired, Army Medical Department, aged 75. He entered the Army on January 19, 1860; served on the Staff, and in the West India Regiment, Royal Artillery, and Army Medical Department. He became Surgeon on March 1, 1873, Surgeon-Major, April 1, 1875, and retired with the honorary rank of Brigade-Surgeon on April 14, 1886. His war service was: Russian War, 1855; Expedition to the Baltic; served in Royal Navy as Acting-Assistant-Surgeon. Medal South African War, 1879; Zulu Campaign; Battle of Ginginhlovo and Relief of Etshowe. Medal with clasp.

EXCHANGES, &c.

The charge for inserting Notices respecting Exchanges in the Royal Army Medical Corps is 5/- for not more than five lines, which should be forwarded by Cheque or P.O.O., with the notice, to Messrs. G. STREET and CO., Ltd., 8, Serle Street, London, W.C., not later than the 22nd of the month.

A Field Officer whose foreign tour of service expired November, 1909, wishes to exchange to India during the coming trooping season. Offers and particulars to "Tulip," c/o Holt & Co., 3, Whitehall Place, S.W.

Field Officer who has been home one year wishes to exchange to India. Address, "Exile," c/o Messrs. Holt & Co., 3, Whitehall Place, London.

Wanted by a Field Officer in England, who may be required to proceed abroad during the coming trooping season, an exchange to remain at home. "Medicus," c/o Sir C. R. McGrigor, Bart. & Co., 25, Charles Street, S.W.

Captain, due for abroad trooping season 1911-12, is willing to exchange to India early this coming trooping season. Apply, W. G., c/o Messrs. Holt & Co., 3, Whitehall Place, S.W.

A free issue of twenty-five excerpts will be made to contributors of all articles classified under the heading of Original Communications, Lectures, Travels, and Proceedings of the United Services Medical Society.

Any demand for excerpts, additional to the above, or for reprints, must be forwarded at the time of submission of the article for publication, and will be charged for at the following rates, and additional copies at proportionate rates :—

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	16	0 7 6	0 3 6				
25	4	0 3 0	0 1 3				
	8	0 5 6	0 2 6	4 0	1 3	3 6	0 9
	16	0 9 6	0 4 6				
50	4	0 4 0	0 1 8				
	8	0 6 9	0 3 2	5 0	1 9	4 0	1 0
	16	0 12 0	0 5 3				
100	4	0 5 6	0 2 9				
	8	0 9 0	0 4 4	6 6	3 3	5 6	2 0
	16	0 16 9	0 6 9				
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	8	0 13 6	0 6 0	9 0	6 3	7 6	4 0
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The back outside cover is not available for advertisements.

Notices.

EDITORIAL NOTICES.

The Editor will be glad to receive original communications upon professional subjects, travel, and personal experiences, &c. He will also be glad to receive items of news and information regarding matters of interest to the Corps from the various garrisons, districts, and commands at home and abroad.

Matter intended for the Corps News should reach the Editor not later than the 15th of each month for the following month's issue. Notices of Births, Marriages, and Deaths are inserted free of charge to subscribers and members of the Corps. All these communications should be written upon one side of the paper only; they should by preference be type-written, but, if not, all proper names should be written in capital letters (or printed) to avoid mistakes, and be addressed The Editor, "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS," War Office, Whitehall, London, S.W.

Communications have been received from Captain C. R. Sylvester Bradley, Major H. A. Hinge, Lieutenant-Colonel M. W. Russell, Major C. E. Pollock, Lieutenant-Colonel C. Birt, Lieutenant-Colonel W. W. Pike, Major S. F. Green, Captain G. B. Crisp, Captain C. Ryley, Lieutenant V. T. Carruthers, Captain C. Scaife.

The following publications have been received:—

British: Annals of Tropical Medicine and Parasitology, Medical Press and Circular, The Army and Navy Gazette, The Hospital, The Royal Engineers' Journal, Journal of the Royal Sanitary Institute, Proceedings of the Royal Society of Medicine, The Practitioner, The Lancet, Guy's Hospital Gazette, The Quarterly Journal of Medicine, Public Health, Red Cross and Ambulance News, The Medical Review, St. Bartholomew's Journal, The St. Thomas's Hospital Gazette, The Indian Medical Gazette, The Journal of Tropical Medicine and Hygiene, The Cavalry Journal, Sleeping Sickness Bureau, Transactions of the Society of Tropical Medicine and Hygiene, Journal of the United Service Institution of India, The Australasian, Archives of the Roentgen Ray.

Foreign: Report of the Department of Sanitation of the Isthmian Canal Commission (April to December, 1909), *Norsk Tidsskrift for Militærmedicin, Revista de Sanidad Militar y La Medicina Militar Española, Le Caducée, The Military Surgeon, Russian Medical Journal, Memorias do Instituto Oswalda Cruz, Archives de Médicine et de Pharmacie Militaires, Tidsskrift I Militär Holsovard, Archives de l'Institut Pasteur de Tunis, Archiv für Schiffs- und Tropen-Hygiene, United States Department of Agriculture, American Medicine, Militaerlaegen, Annali di Medecina Navale e Coloniale, Le Mois Médical, Bulletin of the Johns Hopkins Hospital, Bulletin de l'Institut Pasteur, Boletin de Sanidad Militar.*

MANAGER'S NOTICES.

The JOURNAL OF THE ROYAL ARMY MEDICAL CORPS is published monthly, six months constituting one volume, a volume commencing on 1st July and 1st January of each year.

The Annual Subscription is £1 (which includes postage), and should commence either on 1st July or 1st January; but if a subscriber wishes to commence at any other month he may do so by paying for the odd months between 1st July and 1st January at the rate of 1s. 8d. (one shilling and eightpence) per copy. (All subscriptions are payable in advance.)

Single copies can be obtained at the rate of 2s. per copy.

The Corps News is also issued separately from the Journal, and can be subscribed for at the rate of 2s. (two shillings) per annum, including postage. Subscriptions should commence from 1st July each year; but if intending subscribers wish to commence from any other month, they may do so by paying for the odd months at the rate of 2d. per copy. (All subscriptions are payable in advance.)

Officers of the Royal Army Medical Corps possessing Diplomas in Public Health, &c., are kindly requested to register their special qualifications at Headquarters. Letters of complaint are frequently received from officers stating that their special qualifications have not been shown in the Distribution List which is published as a supplement to the Journal in March and September of each year. As, however, the particulars of this list are supplied from official sources, officers are reminded that unless the possession of Diplomas, &c., has been registered at Headquarters, no entry of such qualifications can be recorded in the Distribution List.

Letters regarding non-delivery of the Journal, or change of address, should be sent to the Hon. Manager, "Journal of the Royal Army Medical Corps," War Office, Whitehall, London, S.W., and reach there not later than the 20th of each month.

It is requested that all Cheques or Postal Orders for Subscriptions to the Journal, Corps News, Reprints, &c., be crossed "Holt & Co.," and made payable to the "Hon. Manager, Journal R.A.M.C.," and not to any individual personally.

All communications for the Hon. Manager regarding subscriptions, &c., should be addressed to

THE HON. MANAGER,
"JOURNAL OF THE ROYAL ARMY MEDICAL CORPS,"
WAR OFFICE, WHITEHALL, S.W.

JOURNAL
OF THE
ROYAL ARMY MEDICAL CORPS.

Corps News.

June, 1910.

ARMY MEDICAL SERVICE.

Surgeon-General Philip M. Ellis retires on retired pay, dated April 23, 1910.

He entered the Service on August 5, 1877; became Surgeon-Major on August 5, 1889; Surgeon-Lieutenant-Colonel August 5, 1897; Lieutenant-Colonel, Royal Army Medical Corps, with higher rate of pay, November 6, 1900; Colonel August 13, 1904; Surgeon-General December 31, 1908; and retired on retired pay on April 23, 1910.

His war service is as follows: Burmese Expedition, 1886-7. Medal with clasp.

Colonel James G. MacNeece to be Surgeon-General, *vice* P. M. Ellis, dated April 23, 1910.

Major Bertal H. Scott, Royal Army Medical Corps, to be a Deputy-Assistant-Director-General at the War Office, *vice* Major H. J. M. Buist, D.S.O., M.B., whose tenure of that appointment has expired, dated May 1, 1910.

ROYAL ARMY MEDICAL CORPS.

Lieutenant Wilfred W. Treves, M.B., is seconded under the provisions of Article 300, Royal Warrant for Pay and Promotion, dated April 1, 1910.

Lieutenant-Colonel Sidney E. Duncan retires on retired pay, dated April 20, 1910.

He entered the Service on January 31, 1885; became Surgeon-Major May 1, 1897; Lieutenant-Colonel January 31, 1905; and retired on retired pay on April 20, 1910.

His war service is as follows: South African War, 1900-2; operations in the Orange Free State, February to May, 1900, including actions at Houtnek (Thoba Mountain), Vet River (May 5 and 6), and Zand River; operations in the Transvaal in May and June, 1900, including actions near Johannesburg, Pretoria, and Diamond Hill (June 11 and 12); operations in the Orange River Colony, July, 1900; operations in the Transvaal west of Pretoria, August to November, 1900; operations in Cape Colony south of Orange River, 1900. Queen's Medal with four clasps. King's Medal with two clasps.

The undermentioned Lieutenants, from the Seconded List, are restored to the Establishment, dated April 1, 1910: Frederick R. Laing, M.B.; John T. Simson, M.B.

Lieutenant-Colonel Charles L. Joslin retires on retired pay, dated May 4, 1910.

He entered the Service on May 30, 1885; became Surgeon-Major May 30, 1897; Lieutenant-Colonel May 30, 1905; and retired on retired pay, May 4, 1910.

His war service is as follows: West Coast of Africa, 1893-4; operations against the Sofas; Expedition to the Gambia against Fodeh Silah; Despatches, London Gazette, May 4, 1894. Medal with clasp. Ashanti Expedition, 1895-6; Star. Operations in Sierra Leone, 1898-9. South African War, 1899-1902. Special Service Officer (Principal Medical Officer, Rhodesian Field force); operations in Rhodesia (October 11, 1899, to May 25, 1900); operations in the Transvaal, west of Pretoria, July to November, 1900; operations in Cape Colony north of Orange River. King's Medal with two clasps.

The undermentioned Captains to be Majors, dated April 27, 1910: George J. S. Archer, M.B.; Robert Selby, M.B.; Sydney O. Hall; Alfred E. Weld; James S,

Gallie; Francis J. C. Heffernan; Arthur E. Thorp; Henry Herrich; James Cowan, M.B.; Austin R. O'Flaherty; Henry B. G. Walton; Edmund P. Hewitt.

Major Charles H. Hopkins is placed temporarily on the half-pay list on account of ill-health, dated April 30, 1910.

Captain Richard J. C. Thompson is seconded for Service with the Egyptian Army, dated April 29, 1910.

Lieutenant Ralph D. V. King resigns his Commission, dated May 14, 1910.

Major Alfred P. Blenkinsop, R.A.M.C., to be Brevet-Lieutenant-Colonel, under the provisions of Articles 35 and 307, Royal Warrant for Pay and Promotion, 1909, dated May 4, 1910.

Quartermaster and Honorary Captain Harry G. Hasell, Royal Army Medical Corps, is granted the honorary rank of Major, dated April 17, 1910.

ARRIVALS HOME FOR DUTY.—From West Coast of Africa: Major F. J. W. Porter, D.S.O. From India: Major G. B. Carter.

Quartermaster and Honorary Captain H. Spackman arrived from South Africa on April 5, 1910, and has been posted to Chatham for duty.

Quartermaster and Honorary Lieutenant J. W. Osborne arrived from South Africa on April 5, 1910, and has been posted to the Southern Command for duty.

Quartermaster and Honorary Lieutenant C. W. Kinsella arrived from South Africa on April 5, 1910, and has been posted to Devonport for duty.

TRANSFERS BETWEEN COMMANDS AT HOME.—Major W. A. Ward from London District to Southern Command; Major H. J. M. Buist, D.S.O., from War Office to London District.

ARRIVALS HOME ON LEAVE.—From India: Major J. D. Alexander; Captains H. H. Norman, P. Dwyer, H. O. M. Beadnell, E. G. Anthonisz, R. G. H. Tate, J. W. L. Scott, and E. D. Caddell. From Egypt: Lieutenant-Colonel W. J. Baker; Captains M. H. G. Fell and L. Bousfield. From South Africa: Major A. E. Smithson; Captain A. S. Littlejohns. From Malta: Captains W. L. Baker and T. H. Gibbon.

EMBARKATIONS.—For India: Major A. W. N. Bowen; Captain C. T. Edmunds.

APPOINTMENTS.—Major C. Dalton, Staff Officer to Principal Medical Officer, Irish Command.

ROSTER FOR SERVICE ABROAD.—The names of Lieutenant-Colonel G. W. Brazier-Creagh, C.M.G., and Major F. J. Wade-Brown have been removed from the roster for service abroad on their notifying their intention to retire.

GOOD SERVICE PENSION.—Surgeon-General G. J. H. Evatt, C.B., retired, has been awarded a Good Service Pension, *vice* Surgeon-General G. L. Hinde, C.B., deceased.

QUALIFICATION.—Captain J. W. West, Royal Army Medical Corps, has obtained the Diploma in Public Health of the Royal College of Physicians and Surgeons, Ireland.

APPOINTMENTS.—Lieutenant-Colonel S. Westcott, C.M.G., Royal Army Medical Corps, has been appointed Honorary Surgeon to His Excellency the Viceroy of India, *vice* Surgeon-General F. W. Trevor, C.B., resigned on promotion to Honorary Surgeon to H.M. The King.

The undermentioned Retired Pay Appointments are vacant: Medical Charge at Fort Stamford, Perth, and Netheravon. Recruiting Medical Officer, Belfast.

The undermentioned appointments are vacant: Staff Officer to the Administrative Medical Officers of the Highland, Lowland, West Riding, Northumbrian, and East Lancashire Divisions (T.F.)

NOTICE.

Army Medical Service.

Officers, on return from service abroad, who may wish to see the Director-General, will be received by him at 12.30 p.m. any day.

Officers serving at home who desire an interview will be seen (with the permission of their General Officers Commanding) on Tuesday and Fridays at the same hour.

MEMORANDUM.

It is notified for general information that the undermentioned officers will be required to proceed to the Commands specified during the coming trooping season.

Definite orders will be issued through the usual channels, and probable dates of embarkation will be notified as soon as possible.

Officers of the same rank ordered to different foreign stations may, by mutual arrangement, have their stations altered ; but it must be clearly understood that, while the Director-General is anxious to meet officers' wishes, it is not always possible to give effect to them. Applications for alteration of station, or for exchanges of position on the roster for service abroad, should be submitted as early as possible ; they cannot be considered if received after the formal orders have been issued for officers to be held in readiness for service abroad, owing to the serious inconvenience caused.

Family forms should be completed and returned without delay.

Officers proceeding to India, who may be desirous of being posted to any particular division, may name any three divisions in the Army to which they are detailed in order of priority of choice, and every effort will be made in India to meet their wishes.

Northern Army, India.

Lieut.-Col. T.W. O'H. Hamilton, C.M.G.
,, R. R. H. Moore.
,, R. W. Wright.
Major E. G. Browne.
,, W. Hallaran.
,, H. G. F. Stallard.
,, W. H. S. Nickerson, V.C.
,, H. B. G. Walton.
Captain W. B. Winkfield.
,, W. M. McLoughlin.
,, J. G. Foster.
,, B. S. Bartlett (by Exchange).
,, R. L. Popham.
Captain H. F. Shea.
,, J. T. Johnson.
,, A. C. Duffey.
,, H. E. J. A. Howley.
,, J. W. West.
,, R. N. Woodley.
,, A. W. A. Irwin.
,, S. M. Adye-Curran.
Lieutenant D. H. C. MacArthur.
,, T. J. Mitchell.
,, D. E. C. Pottinger.
,, H. Gall.
,, A. W. Byrne.

Southern Army, India.

Lieut.-Col. F.W. C. Jones (by Exchange).
,, R. H. Hall.
Major W. W. O. Beveridge, D.S.O.
,, C. E. G. Stalkartt.
,, G. A. Moore.
,, F. R. Buswell (by Exchange).
,, S. J. C. P. Perry.
,, G. E. F. Stammers.
Captain F. Ashe.
,, C. H. Furnivall.
,, J. F. Whelan (by Exchange).
,, E. G. Ffrench.
Captain F. W. Lambelle.
,, G. F. Rugg.
,, G. S. C. Hayes.
Lieutenant G. S. Parkinson.
,, C. H. O'Rorke.
,, J. Startin.
,, C. G. Sherlock.
,, S. W. Kyle.
,, J. W. Lane.
,, W. G. Wright.
,, A. T. J. McCreery.

For Attachment for Anti-typhoid Treatment to Battalions proceeding to India.

Lieutenant J. C. L. Hingston.
,, D. S. Buist.
Lieutenant A. M. Pollard.
,, G. G. Collet.

Gibraltar.

Captain C. R. L. Ronayne (as Ophthalmologist).
Lieutenant F. H. Somers Gardner (for Attachment to a Battalion for Anti-typhoid Treatment).

Malta.

Major H. S. Thurston.
,, A. H. Morris (as Sanitary Officer).
Captain J. A. Hartigan.
Lieutenant A. C. H. Suhr.
,, C. Clarke.
Lieutenant A. R. Wright (for Attachment to Battalion for Anti-typhoid Treatment).
,, T. B. Nicholls (for Attachment to Battalion for Anti-typhoid Treatment).

Straits Settlements.

Captain P. H. Henderson.
,, W. J. Waters.
Lieutenant E. V. Vaughan.

JAMAICA.

Major H. P. W. Barrow (as Sanitary Officer).

Lieutenant S. Field.

BERMUDA.

Lieutenant-Colonel C. Birt.

MAURITIUS.

Lieut.-Col. W. L. Reade
Captain V. J. Crawford (as Midwifery Specialist).

Lieutenant A. N. R. McNeill.

SOUTH CHINA.

Major S. H. Fairrie.
,, F. S. Penny (as Sanitary Officer).

NORTH CHINA.

Lieutenant-Colonel J. M. Irwin.

EGYPT.

Major T. B. Beach.
Captain R. N. Hunt.
Lieutenant J. A. Clark (for Attachment to Battalion for Anti-typhoid Treatment).

Lieutenant S. McK. Saunders (for Attachment to Battalion for Anti-typhoid Treatment).
,, H. H. Leeson.

CEYLON.

Lieutenant F. Worthington.

SOUTH AFRICA.

Major A. E. Thorp.
Captain A. C. Adderley.
,, T. J. Potter (as Bacteriologist).
Lieutenant B. A. Odlum.

Lieutenant J. James.
,, J. B. Jones (for Attachment to Battalion for Anti-typhoid Treatment).

PROMOTIONS.

The following promotions, to complete Establishment, will take effect from the dates specified :—

To be Serjeant-Majors.

No.	Rank and Name	Date	Section	Remarks
9850	Qmr.-Serjt. W. A. Taylor	26.1.10	..	*Vice* C. W. Kinsella, to H.M. Commission.
9990	,, W. Wilson..	4.2.10	..	,, E. Fry, to pension.
9763	,, F. J. Tilbury	3.3.10	..	,, E. C. Bowen, to pension.

To be Quartermaster-Serjeants.

No.	Rank and Name	Date	Section	Remarks
9018	S.-Serjt. S. Taylor ..	19.1.10	..	*Vice* J. McEvoy, to pension.
9425	,, C. W. Hook ..	25.1.10	..	,, M. Powell, to pension.
11225	,, A. Bennett ..	26.1.10	..	,, J. Southwood, to pension.
9245	,, H. Cassell ..	26.1.10	..	,, W. A. Taylor, promoted.
8270	,, F. L. M. Jones	4.2.10	..	,, W. Wilson, promoted
9215	,, A. Holden ..	5.2.10	..	,, A. Ward, to pension.
9668	,, G. Hurrell ..	3.3.10	..	,, E. J. Tilbury, promoted.

To be Staff-Serjeants.

No.	Rank and Name	Date	Section	Remarks
11082	Serjt. J. Fraser.. ..	19.1.10	..	*Vice* W. H. Pleass, to pension.
9896	,, J. R. Story ..	19.1.10	..	,, S. Taylor, promoted.
11450	,, A. H. Owens ..	25.1.10	..	,, A. Pitchforth, to pension.
11779	,, G. Neenan ..	25.1.10	..	,, C. W. Hook, promoted.
12138	,, H. Steele	25.1.10	..	,, G. Neenan, Supernumerary with Colonial Government.
14008	,, D. Watt	26.1.10	..	,, A. Bennett, promoted.
11626	,, H. J. Easey ..	26.1.10	..	,, H. Cassell, promoted.
12522	,, S. Gallie	1.2.10	..	,, D. W. Hannan, to pension.
14505	,, H. Jones	1.2.10	..	,, S. Gallie, Supernumerary with Egyptian Army.
10542	,, A. E. Mendel ..	4.2.10	..	,, F. L. M. Jones, promoted.
10034	,, F. A. Mulley ..	5.2.10	..	,, A. Holden, promoted.
9742	,, E. Heath.. ..	3.3.10	..	,, G. Hurrell ,,
11582	,, J. Ryan	17.3.10	..	,, A. P. Paddick, to pension.
9134	,, H. Ladwick ..	1.4.10	..	To complete Establishment, 1910-11.

To be Serjeants.

18158	Lce.-Serjt. G. P. Pursey	19.1.10	Nursing ..	*Vice* J. Fraser, promoted.
18420	,, A. J. Saunderson	19.1.10	,, ..	,, J. R. Storey, promoted.
15776	,, H. G. Blackman	24.1.10	,, ..	,, D. J. Bell, reduced.
11402	,, E. Stokes ..	25.1.10	,, ..	,, A. H. Owens, promoted.
11789	Crpl. W. Skinner ..	25.1.10	,, ..	,, H. Steele, promoted.
18970	,, J. Higginbottom ..	26.1.10	General Duty	,, D. Watt ,,
12617	,, J. R. Edwards ..	26.1.10	,, ,,	,, H. J. Easey ,,
15288	,, W. C. Prince ..	1.2.10	,, ,,	,, H. Jones ,,
15591	,, J. Harris	4.2.10	Clerical ..	,, A. E. Mendel ,,
15813	,, A. V. Heggie ..	5.2.10	,, ..	,, F. A. Mulley ,,
17210	,, C. E. James ..	9.2.10	General Duty	,, R. J. McKay to Colonial Government.
18577	,, F. L. Read ..	12.2.10	Nursing ..	,, E. Shepherd to Egyptian Army.
11788	Lce.-Serjt. D. Macdonald	20.2.10	General Duty	,, H. G. Wales, to pension.
11577	Crpl. D. Russell.. ..	21.2.10	Nursing ..	,, W. Hinton, to pension.
14620	,, S. Gowers	25.2.10	Cooking ..	,, A. S. Walsh, to Territorial Forces.
18110	,, R. W. Gibson ..	28.2.10	Nursing ..	,, A. Spowage, to Territorial Forces.
12395	,, E. J. Gibson ..	3.3.10	,, ..	,, E. Heath, promoted.
11075	Lce.-Serjt. A. J. Daintree	16.3.10	General Duty	,, A. Davidson to Colonial Government.

To be Serjeants—continued.

No.	Rank and Name	Date	Section	Remarks
16289	Crpl. C. G. Hearn ..	17.3.10	Clerical ..	„ J. Ryan, promoted.
10150	„ G. D. Mosby ..	17.3.10	Nursing ..	„ L. T. Fitzgerald, reduced.
18948	„ E. Moore	20.3.10	„ ..	„ F. T. Foot, to pension.
17857	„ A. E. Macklen ..	22.3.10	„ ..	„ G. Skinner, to pension.
15725	Lce.-Serjt. T. Eastwood	1.4.10	„ ..	„ H. Ladwick, promoted.

To be Corporals.

To complete establishment, 1.4.10: 16196 Lance-Corporal A. A. Tomley, Clerical; 17513 Lance-Corporal J. Gallivan, Nursing; 17553 Lance-Corporal J. R. Morfitt, Clerical; 19322 Lance-Corporal H. Elliott, Nursing; 19396 Lance-Corporal H. Baker, Clerical; 586 Lance-Corporal W. A. Gordon, Clerical; 751 Lance-Corporal A. J. Milne, Clerical; 19924 Lance-Corporal E. D. Barr, Nursing; 18902 Lance-Corporal W. Blundell, Clerical; 10661 Lance-Corporal S. H. Tempest, Cooking; 11566 Lance-Corporal M. T. Brown, General Duty; 11755 Lance-Corporal J. Paulizky, General Duty; 11822 Lance-Corporal G. E. Johnson, Nursing; 12344 Lance-Corporal F. H. Lucas, General Duty; 14090 Lance-Corporal F. W. Wells, Clerical; 1831 Lance-Corporal S. T. Riley, General Duty; 17910 Lance-Corporal W. Green, Clerical; 14888 Lance-Corporal H. Currell, General Duty; 15022 Lance-Corporal F. Woodward, Nursing; 15804 Lance-Corporal J. Fitze, Cooking; 16481 Lance-Corporal W. W. Bee, Nursing; 17091 Lance-Corporal J. Moore, Nursing; 18917 Lance-Corporal H. Chadwick, Nursing; 17379 Lance-Corporal E. Hardy, clerical; 17609 Lance-Corporal P. McDonnell, General Duty; 17728 Lance-Corporal T. Hynes, General Duty; 19320 Lance-Corporal H. A. Ritchie, Nursing; 10450 Lance-Corporal T. Fry, General Duty; 12428 Lance-Corporal F. J. Ferguson, Nursing; 12474 Lance-Corporal W. Soper, Nursing; 14690 Lance-Corporal G. W. Syckelmoore, Nursing; 15558 Lance-Corporal E. H. Jesson, Nursing; 15683 Lance-Corporal T. P. Dent, Nursing; 16442 Lance-Corporal W. Lawson, General Duty; 17162 Lance-Corporal T. Rogers, General Duty; 17696 Lance-Corporal S. Collins, Nursing.

APPOINTMENTS.

The following appointments, to complete Establishment, will take effect from the dates specified:—

To be Lance-Serjeants.

No.	Rank and Name	Date	Section	Remarks	
9454	Cpl. A. N. Girling ...	1.4.10	Cooking ...	Special as Superintending Cook	To complete Establishment.
10076	„ W. H. Brown ...		Nursing ...	As Dispensers ..	
11275	„ A. Breewood ..		Cooking ..		
15483	„ E. Sharp		General Duty		
12506	„ P. J. O'Rourke ..		Nursing ..		
15671	„ R. W. Cole.. ..		Clerical ..		
17057	„ M. Ward		Q.A.I.M.N.S.		

To be Lance-Corporals.

No.	Rank and Name	Date	Section	Remarks
19223*	Pte. J. H. Stafford ..	22.2.10	General Duty	
19555*	,, P. C. Martin ..	22.2.10	Clerical ..	
874*	,, F. A. Johnson ..	25.2.10	Nursing ..	
19558*	,, T. Lythgoe ..	21.3.10	1st Class Clerk	
10464	,, A. Morgan.. ..		Q.A.I.M.N.S.	
11437	,, J. W. Deasley ..		Nursing ..	
11532	,, A. Callander ..		1st Class Clerk	
12175	,, W. Murphy ..		General Duty	
12357	,, H. W. Griffin ..		Nursing ..	
15803	,, H. B. Stuart ..		,, ..	
17711	,, D. C. Holland ..		Cooking ..	
17962	,, H. Low		General Duty	
18040	,, W. Toothill ..		,, ,,	
18229	,, J. Turbyne ..		,, ,,	
18262	,, E. W. Clear ..		Nursing ..	
18257	,, J. Percy		General Duty	
18258	,, H. Tempo		Nursing ..	
18259	,, W. T. Roden ..		General Duty	
18274	,, W. R. Nixon ..		Nursing ..	
18288	,, C. Wheeler ..		,, ..	
18280	,, F. Golden	1.4.10	General Duty	To complete Establishment.
18291	,, G. Johnston ..		Clerical ..	
18295	,, G. Aukland ..		Nursing ..	
18318	,, E. G. Thomas ..		1st Class Clerk	
18301	,, C. J. Molden ..		Clerical ..	
18302	,, W. Smith		Cooking ..	
18326	,, R. E. S. Harris ..		General Duty	
18335	,, W. J. Woolway ..		Nursing ..	
18330	,, J. N. Mercer ..		1st Class Clerk	
18340	,, J. Rouse		Nursing ..	
18383	,, W. Hutchings ..		1st Class Clerk	
18423	,, R. C. Hanks ..		General Duty	
18395	,, C. A. J. Speller ..		Nursing ..	
18411	,, G. H. Richards ..		,, ..	
18417	,, J. Knight		General Duty	
18418	,, G. Smith		Nursing ..	
18443	,, G. Harris		Q.A.I.M.N.S.	
18447	,, J. E. Fakes ..		1st Class Clerk	
18468	,, W. H. Buchanan..		,, ,,	
18498	,, E. R. Ross ..		Nursing ..	
18490	,, H. Cooper		General Duty	
19256*	,, W. King		,, ,,	

* Special under para. 281, S.O., R.A.M.C.

Nursing Section.—The following appointments to the **Nursing Section of the Corps** will take effect from the dates specified :—

No.	Rank and Name	Date	No.	Rank and Name	Date
12537	Sjt. F. Molloy ..	1.10.09	1549	Pte. M. F. Flannery	
1754	Pte. W. F. Card ..		2055	,, C. Covell ..	22.2.10
4301	,, C. R. Locke ..	11.1.10	2167	,, A. J. Stirk ..	
4350	,, E. Preedy ..		2191	,, J. W. Hayes ..	
2006	,, J. E. Bray ..	15.1.10	2039	,, H. Tomson ..	
2222	,, W. H. Baker ..		2268	,, T. Danks ..	26.2.10
19127	,, D. J. Ayling ..	20.1.10	4329	,, R. S. Wilkin ..	
2155	,, W. R. Burr ..		4366	,, J. Dunlop ..	1.3.10
4305	,, W. Marsden ..	24.1.10	4393	,, T. B. Hargrave..	
4359	,, C. G. Garrett ..		19021	Sjt. A. A. Dell ..	
1891	,, H. J. Rance ..		11734	Cpl. A. H. O. Campion	12.3.10
1951	,, F. J. R. Money..		11894	Pte. R. Snow ..	
1985	,, R. H. Brown ..	4.2.10	2157	,, C. W. Newell ..	
2297	,, T. Macmillan ..		2240	,, E. W. Minns ..	14.3.10
4317	,, J. Cummins ..		4341	,, R. McCarrey ..	
1586	,, H. G. Titman ..	7.2.10	1426	,, A. G. Pike ..	
2266	,, T. S. Mills ..	8.2.10	4338	,, A. Kemp ..	15.3.10
4370	,, T. Harrison ..		4410	,, G. Anderson ..	
19536	,, E Reece ..	12.2.10	17494	,, F. Peckham ..	19.3.10
1799	,, S. A. Stowe ..	19.2.10	19525	,, H. J. Thomason	21.3.10
963	,, J. White.. ..		1881	,, J. W. Walker ..	
1407	,, G. Staples ..	21.2.10	4332	,, R. H. Jacks ..	30.3.10
1415	,, F. W. A. Graylen		4552	,, J. T. Leat ..	
4340	,, A. E. Cansfield..				

Advancement of Privates (Corps Pay).—The following advancements in rate of Corps Pay will take effect from April 1, 1910:—

To be Advanced to the Third Rate (at 8d.).

As Orderlies.

No.	Name	No.	Name	No	Name
17899	Dyke, W. E.	19095	Furze, V.	155	Carter, S. J.
17972	Burgess, G.	19150	Messenger, T. H.	196	Kent, A. J.
18284	Martin, F.	19232	Thorpe, W. H.	211	Goulding, G. F.
18425	Atkinson, F. W.	19259	Burrows, A. W.	257	Coles, R. J.
18544	Branchett, E. T.	19353	Chapple, J.	272	Pout, R. M.
18686	Rann, J.	19439	Weller, G. A.	305	Hobbes, J. W.
18737	Stovold, W. T.	19541	May, F.	795	Hunt, H. H.
18922	Cussell, G.	73	Ellard, F.	918	Nelson, W.
19085	Vinton, C. J.	149	Coote, H. N.	1098	Wright, G. M.

As Clerks.

18327	Beattie, G.	19898	Ames, C. M.	1430	Perkins, W. T.
18829	Chesterman, F. E.	408	Kniep, O.	1875	Kitchen, J. E.

To be Advanced to the Fourth Rate (at 6d.).

As Orderlies.

No.	Name	No.	Name	No.	Name
18251	Ovenden, E. E.	1190	Handasyde, S.	1750	Barron, P.
19984	Harrison, G.	1425	Evamy, W.	1751	Plaum, F. H.
68	Chew, P. B.	1548	Paskell, R. J.	1885	Marshall, E. D.
501	Benson, O.	1560	Ansley, W. A.	1981	Pavier, G.
866	Shinn, W.	1650	Ridewood, W. B.	2106	Macdonald, J.
1071	Stocker, J. N.	1715	Rogers, H. G.	2188	Smithies, A.
1089	Woods, H.	1731	Northcott, C.		

As Clerks.

19385	Johnson, H.	1362	Powell, E. A.	2221	Coleman, G.
19913	Roberts, T. S.	1584	Phillips, W. E.		
19988	Marsh, E. H.	1862	Doyle. G. A.		

As Cooks.

18929	Taylor, J. W.	19347	White, A. J.	1438	Ridehalgh, G. L.
19109	Pout, H. W.	706	Allan, R.	1623	Atkinson, W.
19237	Naylor, W.	940	Harris, W.	1664	Bright, T. W.
19301	Richardson, H.	1152	Burgess, A.	2022	Wallace, G. A.

Sanitary Orderlies (Corps Pay).—The following Privates are advanced to the Fourth Rate of Corps Pay at 6d., as Sanitary Orderlies, from the dates specified :—

No.	Name	Date	No.	Name	Date
16980	Stuart, S. K... ..	4.12.09	2205	Lewis, A. R.	26.2.10
1559	Wyatt, W. H. ..	21.12.09	1772	Butler, M. A. ..	1.3.10
992	Killigrew, H. ..	1.1.10	738	Ryan, M.	1.3.10
2051	Hackett, J.	3.1.10	2142	Taylor, W. D. ..	4.3.10
1793	Lines, A. E.	16.1.10	1689	Shields, H.	11.3.10
18506	Cray, R. W.	18.1.10	2044	King, J.	12.3.10
1537	Johnson, J.	18.1.10	846	Dean, G. S.	14.3.10
19979	Thain, E. G... ..	19.1.10	4443	White, E. H. ..	29.3.10
1370	Nagle, C.	22.1.10	2215	Hegarty, S. D. ..	31.3.10
2043	Barleycorn, F. J. F.	14.2.10	2168	Sumner, W. S. ..	31.3.10

Buglers.—The following Boys are appointed Buglers from the date specified :—

No.	Name	Date	No.	Name	Date
1861	Simmons, J. C. R. ..	22.3.10	2091	Elwood, T. W. ..	29.3.10

Transfer Sections.—The following Lance-Corporal is transferred from the "Clerical Section" to the "General Duty Section" from the date specified: 18019 J. G. Julyan, March 8, 1910.

Promotion Cancelled.—The promotion to Corporal of 15969 Lance-Corporal F. C. Dean, notified in Corps Orders, dated January 1, 1910, is hereby cancelled.

Advancement Corps Pay, Cancelled.—The advancement of 1799 Private S. H. Stowe to the fourth rate of Corps Pay as a Clerk, notified in Corps Orders, dated January 1. 1910, is hereby cancelled, this man having transferred to the Nursing Section.

Notice.—The Officer in charge of Records has much pleasure in publishing the following extract from a minute by His Excellency Sir H. Hesketh Bell for communication to 9043 Serjeant J. Murley, R.A.M.C., lately serving in the Medical Department of Northern Nigeria :—

"Please inform Serjeant Murley that his gallant conduct during the Gussoro ambuscade has been brought to the Secretary of State's notice, and that the Earl of Crewe has expressed his appreciation of it.

"His Excellency has also read the papers on the subject, and he greatly admires the coolness and intrepidity which he showed during the fight."

DISCHARGES.—5797 Quartermaster-Serjeant H. H. Collins, May 1, 1910, to pension; 1458 Private G. A. Walker, April 22, 1910, medically unfit; 18495 Private T. Bye, April 20, 1910, termination of first period; 19837 Private J. McFarland, April 30, 1910, medically unfit; 12217 Private F. Cockayne, May 3, 1910, medically unfit; 11771 Private T. Wyatt, May 1, 1910, termination of first period; 11787 Private A. E. Clements, May 1, 1910; termination of first period; 7557 Private F. Graziani, May 14, 1910, to pension.

TRANSFERS TO ARMY RESERVE.—17552 Private C. E. White, April 15, 1910; 17562 Private A. B. Tivy, April 14, 1910; 17570 Corporal J. Morris, April 18, 1910; 17492 Private S. Warrington, April 2, 1910; 17591 Private J. Young, April 22, 1910; 17580 M. P. Walsh, April 21, 1910; 17564 Private W. H. White, April 21, 1910; 17577 Private A. E. Lawrence, April 22, 1910; 17574 Private T. Collins, April 22, 1910; 17579 Private W. C. McKeer, April 24, 1910; 17606 Private F. E. Cullen, April 30, 1910; 17590 Private V. G. Way, April 25, 1910; 19008 Private F. Coffey, April 29, 1910; 1100 Private C. J. Kendall, May 2, 1910; 1101 Private L. Barnacott, May 2, 1910; 1103 Private W. Provan, May 6, 1910.

TRANSFER FROM OTHER CORPS.—4977 Private W. Wilson, April 17, 1910, from Royal Scots Fusiliers.

TRANSFERS TO OTHER CORPS.—11089 Serjeant F. S. Flint, April 13, 1910, to Colonial Government; 100 Private R. A. A. Ellis, April 12, 1910, to Leicester Regiment; 1415 Private F. W. Graylen, April 16, 1910, to R.G.A.; 4503 Private D. Bell, April 16, 1910, to R.E.; 1468 Private W. H. Shapter, April 24, 1910, to D.C.L.I.; 4765 Private G. W. Thompson, May 12, 1910, to 18th Hussars.

DISEMBARKATIONS FROM ABROAD.

From Malta, per ss. "City of Benares," April 11, 1910: 10400 Serjeant F. Catley.

From South Africa, per ss. "Gaika," April 22, 1910: 8280 Serjeant-Major E. E. Ward.

From South Africa, per ss. "Goth," April 18, 1910: 9515 Quartermaster-Serjeant R. J. Fleming.

DEATHS.

10766 Corporal D. Osborne, April 7, 1910, at Khartoum; 11743 Corporal G. Midgeley, April 29, 1910, at Aldershot.

THE FOLLOWING N.C.O.'S AND MEN HAVE QUALIFIED FOR PROMOTION IN THE VARIOUS CORPS EXAMINATIONS:—

For Quartermaster-Serjeant.—10445 Staff-Serjeant E. Haynes.

For Staff-Serjeant.—12155 Serjeant A. McKay.

For Serjeant.—15671 Corporal R. W. Cole, 17730 Corporal P. Wills, 16446 Corporal W. Whitehead, 16564 Lance-Serjeant C. Vickers, 17358 Corporal C. Ennor, 18890 Corporal J. Moore.

For Corporal.—155 Private S. J. Carter, 304 Private W. I. Haskins, 1369 Private B. L. Earle, 2221 Private G. Coleman, 681 Private H. Tyrrell, 16979 Private R. V. V. Egan, 19401 Private A. E. Harland, 192 Private J. Murray, 18585 Private F. Mills, 19303 Private R. T. Green.

NOTES FROM THE WAR OFFICE.—An interesting little ceremony took place at the War Office on Wednesday, May 18, when Lieutenant and Quartermaster J. Clark was presented by his *confrères* in the Army Medical Department, with a token of their esteem, which took the shape of a handsome dining-room clock.

Lieutenant Clark, who was promoted to that rank on the 18th inst., has served for many years in the Corps branch of the War Office as Superintending Clerk, and has earned the respect and esteem of all who have come into contact with him. He was

also the recipient of many congratulations and expressions of goodwill from his friends, who also expressed their sincere regret at losing such a genial and popular comrade.

He goes to Woolwich for duty.

NOTES FROM ALDERSHOT:—

The late Major Kenneth Cameron.—The funeral of the late Major Kenneth Cameron, R.A.M.C., took place on May 11 to Tomnahurich Cemetery with military honours. At Aldershot the remains were conveyed with military ceremonial from the Cambridge Hospital to the railway station, the procession being headed by Gordon Highlanders. Representatives were present from the Royal Army Medical Corps, 1st Battalion Cameron Highlanders, and officers of the Aldershot Garrison. The remains were met at Inverness, on arrival of the 9.30 a.m. train, by a large party of Cameron Highlanders from the Cameron Barracks. The coffin, enshrouded in a Union Jack, was placed on a gun carriage, drawn by four horses, provided by the Inverness Royal Horse Artillery (Territorials). Major Cameron was well known in Inverness and Skye, and a number of the public joined in the procession to the cemetery. Although the Camerons' pipe band was in the procession, no music was played owing to the King's death. The remains were first taken to St. Andrew's Cathedral, where Rev. Mr. Gibson, assisted by Rev. Mr. Ritchie, conducted the service. The funeral then proceeded to the cemetery, where Rev. Mr. Gibson concluded the service at the grave. Three volleys were fired by the Cameron firing party. Between each volley the drummers beat the tattoo, and Piper Macdougall Gillies, Glasgow, played a portion of "Maccrimmon's Lament." The pall-bearers were Mr. William Mackenzie, uncle of deceased; Mr. Kenneth Macdonald, Skeabost, cousin; Captain Mackinnon, 9th Gurkha Rifles, brother-in-law; Captain Mackinnon, Scottish Rifles, brother-in-law; Mr. C. Macdonald and Mr. A. Campbell, Kilberry, Argyllshire; Captain Horne and Captain Campbell, Cameron Highlanders. Mrs. Cameron and Mrs. Fegan, her sister, were present. Many floral wreaths were placed on the grave, one being sent by Lord Kitchener and another by Surgeon-General Gubbins, Director-General.

NOTES FROM DEVONPORT.—Lieutenant and Quartermaster C. W. Kinsella, R.A.M.C., writes: "Colonel Jennings, A.M.O., and Lieutenant-Colonel Kirkpatrick, C.M.G., took part in a Southern Command Staff Tour in the vicinity of Bath from April 25 to 28.

"Lieutenant-Colonel Kirkpatrick, C.M.G., having proceeded on leave during May, the command of the Military Hospital, Devonport, and No. 7 Company, Royal Army Medical Corps, devolved on Major N. Tyacke.

"Lieutenant and Quartermaster Kinsella (as a Warrant Officer) went up at the December Promotion Examination, in Subhead di, Appendix XI. K.R. and was successful.

"The questions set were as follows:—

"SUBHEAD DI.—Military Engineering, Tactics, Map Reading, Field Sketching, and Reconnaisance.

"*First Paper—Time allowed, three hours.*

"*General Idea.*—A Northern State (Red), and a Southern State (Blue), are at war with one another. The frontier between the two States is a line running east and west through Brackley. The latter place is Southern (Blue) territory.

"*Special Idea (Red).*—The Red Commander-in-Chief has sent a force consisting of 1 squadron cavalry, 1 battery Royal Field Artillery, 1 field company Royal Engineers, 1 brigade infantry, and 1 field ambulance, from Rugby (Red's base), with the object of seizing Brackley. The latest intelligence is that Blue has a force of about 2,000 of all arms at Brackley, out of which a detachment of about 250 men has been pushed forward to Farthinghoe.

"*Composition of Red Advanced Guard.*—One squadron 8th Hussars, 1 section 21st Battery Royal Field Artillery, 1 section field company Royal Engineers, 4 companys 1st Hants Regiment, Bearer Division of 1 section of a field ambulance with two ambulances.

"NARRATIVE OF EVENTS.—At 12 noon on December 7, 1909, the main body of the abovementioned (Red) Force halts in the vicinity of Chalcombe for half an hour. *You are in command of the Advanced Guard* (composition as above) and at 12 noon your main guard is passing through Lower Middleton Cheney, when you receive the following message from the Commander of your vanguard:—

"'To Officer Commanding Advanced Guard,
"'On Lower Middleton Cheney, Chalcombe Road.

December 7, 1909.

"'No. 12.—My patrols are in touch with the enemy's mounted patrols in the low ground north-west of Farthinghoe. From information received from the local postman I am of opinion that the enemy has only about 300 men at Farthinghoe.

"'A. B.,
"'Major, 8th Hussars,
"'Farthinghoe Railway Station.

"'Despatched by mounted orderly at 11.45 a.m.'

"After personal reconnaisance you determine to attack forthwith with your Advanced Guard and drive the enemy off the high ground by Farthinghoe.

"EXERCISES.—(1) Write your attack orders, giving reasons for same (120 marks).

"(2) Write the message that you would send to the General Officer-in-Command, Red Force (40 marks).

"NARRATIVE OF EVENTS.—By 2.30 p.m. your attack has been completely successful. The enemy's force at Farthinghoe has been driven back in a south-easterly direction, and is being followed by three troops of your squadron. You have re-assembled the remainder of your Force at Farthinghoe. You receive the following instruction from the General Officer Commanding Red Force.

"'To Officer Commanding Advanced Guard,
'Farthinghoe.

'*December* 7, 1909.

"'No. 14.—(1) There is no information concerning the enemy except that furnished by you.

"'(2) The main body will halt to-night in the vicinity of Farthinghoe Station. The march will be continued to-morrow.

"'(3) Your troops, less one section 21st Battery Royal Field Artillery, will form the outposts until relieved at about 8.30 a.m. to-morrow by the Advanced Guard for to-morrow's march, when they will join their respective units. *You are appointed Commander of the outposts.* There are no other outpost troops on your flanks.

"'(4) The general position to be occupied by the outposts will be Astrophill Farm, Farthinghoe Lodge, Cross Roads, 400 yards east of Farthinghoe, Cockley Brake Junction.

"'(5) Should the enemy attack, the main body will reinforce the outposts.

"'(6) The section of 21st Battery Royal Field Artillery will rejoin its battery near Farthinghoe Station at 4 p.m. to-day.

"'C. D., Major,
"'General Staff, Red Force,
"'Farthinghoe Station.

"'Despatched by mounted orderly at 2.15 p.m.'

"EXERCISE 3.—Write outposts orders and show the position of the outposts in detail on the map in red.

"Give your reasons for the distribution of the outposts you have decided upon. (140 marks.)

"*Second Paper.*

"*General Idea.*—Same as given above in first paper.

"*Special Idea (Red).*—A Red Force, based on Rugby, consisting of 2 squadrons of cavalry, 1 battery Royal Field Artillery, 1 field company Royal Engineers, 1 brigade of Infantry, and 1 field ambulance, is retiring through Warkworth and Chalcombe, followed by a superior Blue Force.

"*Composition of Red Rear-guard.*—Two squadrons 8th Hussars, 1 section 21st Battery Royal Field Artillery, 1 section field company Royal Engineers, 4 companys Hants Regiment, Bearer Division of section of a field ambulance with two ambulances.

"At 8 a.m. on December 8, 1909, the Red Rear Guard (composition as above), *of which you are the Commander*, has just passed through Warkworth, when you receive instructions from the General Officer Commanding Red Force to delay the enemy south of Chalcombe as long as may be consistent with a safe withdrawal of your rear-guard, so as to allow the main body to have a considerable halt about 1½ miles north of Chalcombe. The Advanced Guard of the Blue Force is about 10 miles south of Warkworth at 8 a.m.

"To carry out the above instructions you decide to entrench and take up a position on the high ground south of Chalcombe.

"EXERCISES.—(1) How much time do you calculate you will have available to entrench the position? What arrangements should be made before the arrival of the troops on the position, and how would you carry them out? (50 marks.)

"(2) Discuss the advantages and disadvantages of the position for the present purpose, and give the dispositions of your Force that you decide upon to oppose the enemy. (100 marks.)

"(3) Show in red on the map the position of the field fortifications that you decide to carry out. Draw hand sketches in your Army Book 4 to illustrate the latter, and give explanations and calculations to show that the work you undertake can be completed in the time available. (120 marks.)

"(4) Describe the method of marching on a compass bearing at night, with the aid of a luminous compass and the stars. (30 marks.)

Time Limit for Second Paper—three hours.

"Lieutenant and Quartermaster Kinsella has now qualified in the four subheads di to div, Appendix xi. K.R., being 'distinguished' in two.

"On May 6, Lieutenant-General Sir C. W. H. Douglas, General Officer Commanding in Chief, Southern Command, accompanied by Major-General C. R. Maxwell, M.G.A., Major-General E. A. Bowles and Staff, and Colonel R. Jennings, A.M.O., inspected No. 7 Company and the Military Hospital, Devonport.

"The Company, which was drawn up in marching order (under the command of Major Tyacke, with Major O'Flaherty as Company Officer), received the Inspecting Officer with a general salute.

"A keen scrutiny of the ranks was made, followed by a visit to the barrack-rooms, wards, &c., and an examination of the summer programme of training, in which the General Officer Commanding expressed much interest, complimenting Captain F. Harvey, Specialist Sanitary Officer, on the excellence of his lectures.

"Sir Charles, on leaving, expressed his satisfaction at the state of affairs.

"On May 14, Captain W. MacDowell, with ten N.C.O.'s and men, proceeded to Willsworthy Camp for duty, and Sanitary Squad practice and instruction.

NOTES FROM CAIRO.—Major Forrest writes: "No 33 Company is developing an inquiring mind, the result no doubt of the various courses of study that it is attending under the tuition of its numerous instructors—the Master Cook, the Matron, the Sisters, and Officers. Prompted by the unbounded energy of the Principal, Medical Officers and N.C.O.'s are diving into all sorts of books that hitherto have only been looked upon as articles for production at Annual Inspections. Now we want to know everything about A.M.O's in the Field; what you can get, beg, borrow, steal, or order from other people, what the Germans do, how they do things in Austria, and what not?

"It stands to reason, with the mind being cultivated to pry into things in business hours, that the training leads to adopting similar tactics at other times, and so we pry into everything around us. We notice, for instance, that thousands and thousands of visitors come to Egypt every winter, and we set about to find out what they come in search of. Without leaving the Citadel we find out quite a lot, we see them streaming up the hill in cabs, mostly in the afternoon, for the guide-books recommend the sunset views, all sorts and conditions of men and women of every nationality, old, young, fat, thin, pretty, and ugly; honeymooning couples, far too wrapped in each other to notice much of what they have come to see, the very much nouveaux-riches—mother with a couple of fine-looking daughters, the old man evidently out for his health to escape the rigours of an European winter, and here is a party all in mourning who are evidently seeking distraction in new surroundings from some recent painful family event. We see others coming up the hill on donkeys. They have already learned to fear the extortionate demands of the Cairo cabby; still, the donkey-boy knows when to take his chance. It is not long since that we overheard an old lady of considerable dimensions discussing the fare to the top of the Citadel and back. "And you are sure you will take me up for a shilling, wait for me, and bring me back for another shilling?" which terms the donkey-boy agreed to, knowing that it would take ten return trips with Mr. Atkins in the summer-time to earn the same amount of money.

"We know what they come up to see, how they all file into the Mohammed Ali Mosque; how they are taken round to see the spot from which the last of the Mamelukes leaped over the wall on horseback to escape death, and how they then go past the hospital cowshed to see "Ze Well of Ijoseff, not Ze Ijoseff of Ze Bible, but anozzer Ijoseff."

"Few of them know what they miss by not being allowed past the sentry at the inner gate, for are not all the glories of the Military Hospital to be seen inside? If we let them in there would be money in it. Hundreds of visitors would be glad to pay 5s. to see the room marked "Ministre de la Guerre," now used as the X-ray room, where Hall Caine's notorious "White Prophet" was tried by a General Court Martial, consisting, as described, of one full Colonel and three Lieutenant-Colonels, and to see the window, in what is now the dysentery ward, at which the heroine sat when the irrepressible A.D.C. rushed out from the closed court to announce the finding and sentence long before they could have been referred to higher authority.

"For the time being it is not necessary to raise money in this way, for we recently received a handsome present of £40 for the Hospital Funds from the 3rd Coldstream Guards, being our share of profits realised at a dramatic performance of the "Babes in the Wood," a play written and got up during the winter by the talented Amateur Dramatic Society of that distinguished Regiment.

"We know a lot of other places in Cairo that the visitor goes to, and we follow him up from time to time; see him yawning in the mosques, and see him pay through the nose in the bazaars for things that we buy for one-eighth the price later on, when trade is not so brisk.

"But then they get into the train and disappear up country to see other sights, and No. 33 Company has neither the time nor the money to follow them all the way.

"But what about Sakkarah? They all seem to go there. On inquiry we find that only about three men in the Company have ever been there. This is very poor for an intellectual and inquisitive crowd like No. 33, so, with a promise of an extra squeeze to the long-suffering canteen fund, at a meeting of the Recreation Club all hands went up in favour of a trip to Sahkarah, to follow up the tourist and see something more of Egypt.

"The machinery was soon in motion, free passes to visit the tombs were applied for, a letter in bad Arabic was concocted to the Sheikh of the donkeys at Badrachein (he is, as a matter of fact, more accustomed to telegrams in English) to have the requisite number of donkeys in readiness.

"Captain Essex and Quartermaster-Serjeant Banks agreed to look to the catering, and the dates were fixed for two excursions for the last Sunday in March, and the first one in April; we could not all go away together and leave the Sisters to do all the work.

"But horrors! What have we done? The Church informs us that the first excursion day is Easter Sunday, and points out our wicked ways. The leader of the expedition explains that it is an ingrown habit, and how he spent some of his early years at a Moravian School in Germany where the whole community— men, women, and children —turn out at daybreak on Easter morning and march, brass band in front, to the cemetery to hold a special Easter Service; therefore, that he is only carrying out the lessons of his youth. After exchanging other similies the incident closes.

"On the morning of March 27, the first party, about thirty strong, paraded in drill order with haversacks and water-bottles, at the provision store, and each man drew a generous supply of ham and beef sandwiches, hard-boiled eggs, and a ration of candle. This last item, although an acceptable article of diet in Labrador, was marked, 'Not to be eaten, but burnt underground.' By 9.15 the party was at the railway station, where they were joined by some of the officers, including the Principal Medical Officer (Colonel Corker), who expressed his approval of the move in this very practical manner.

"An hour's run in the train, over the line that leads to Khartoum, brought us to Badrachein, where we were greeted by Mohammed Dedo, Sheikh of the Donkeys, who had a long column of thirty-four donkeys of varying size, colour, and carrying capacity ready for us. These answer variously with a certain amount of shouting and beating to well-known names such as Whisky Soda, Yankee Doodle, Lillie Langtry, Winston Churchill, &c. We were the chief tourists of the day and other small independent parties had to stand by and see us off before they could be attended to. The men filed off as they got mounted, the officer's luncheon basket, the mens' eight-gallon beer jar, and a box load or two of minerals were placed on the heads of willing fellaheen; Colonel Corker and Major Forrest mounted the ponies they had brought with them by train and the column was in motion.

"The first halt was at the prostrate statue of Rameses the Second, the only sight of the great city of Memphis, now buried under Nile mud, that is at present popular with the tourist. Some very interesting excavations are being conducted here at present by Professor Flinders Petrie, but Memphis not being on our programme we confined our attention to the great statue, which is of some military interest in so far that it was exhumed and placed in its present situation by a party of Royal Engineers.

"Mounting again we continued on our way over the fertile plain of the Nile Valley, noting a variety of agricultural scenes that we would again shortly see depicted on the walls of some of the tombs, work executed about 4,000 years previously and illustrating methods which are still in vogue to-day with the fellaheen.

"The Step Pyramid, father of these wonderful erections on the elevated and sand-covered ground, began to look ever so much nearer, and in a short time we reached the line where, cultivation getting so scraggy, the desert begins.

"Another halt was called, and the party divided into two sections under Major Forrest and Captain Rahilly respectively, who, on the strength of former visits and a cursory study of guide books, assumed the *rôle* of dragomans and took their parties off in different directions after arranging a rendezvous for lunch on the shady side of the Step Pyramid.

"Just as Memphis has been buried in Nile mud, so is the great graveyard of Sakkarah, which did duty for over 3,000 years, now buried in sand blown off the desert.

"On arriving on the high land one sees nothing but sand, irregular mounds, and a variety of pyramid. The ground is strewn with loose stones, ships of pottery, and in many places bits of human bones. Many of the excavated tombs have now got modern skylights which are to some extent landmarks and help to convince the unbelieving that there is something to be seen after all.

"Our first endeavour was to dive down into the tomb of King Omnos, under a small pyramid in a very delapidated condition, where we noted the hieroglyphics and the notched-out carving of the Fifth Dynasty, and then we went down a Persian shaft tomb of a much later period, in small parties at a time. To get into this one went down a modern spiral iron staircase, 117 steps in all. The climb up again was the joyful part, the explorers arriving pale and panting, some uncomplimentary remarks on the ancient Egyptian and his methods were passed, and the dragoman was given to understand that he was playing practical jokes.

"In this neighbourhood we explored a perfect honeycomb of tombs or family vaults, hewn out in the rock to the right and left of passages which had also been hewn in the rock. The place was littered with bones. The osteological instinct arose strongly in both teachers and pupils, and many bones were critically examined. We noted that, although skulls exhumed at home and calculated to be 500 or 600 years old are fitted with perfect dentures, the Egyptian skull, 3,000 years old, frequently had one or more teeth missing which must have been extracted during life.

"From the bulging appearance of some of the haversacks after luncheon it is more than probable that some of the skulls went to resurrect some day in a different part of the world to the rest of the body.

"Groping about in dark passages with candles and climbing spiral staircases with the temperature over 80° makes one thirsty and hungry, so the gathering of the clan at the Step Pyramid was a distinctly happy one, especially when H. and G. Simonds' jar was breached.

"Private Vinton, our skiagraphist and a court photographer, was in attendance and took some interesting pictures. The second party lunched on the same spot on the following Sunday but had no photographer. While they were all resting in the shade a small party of tourists went past; one of them dismounted and started getting his camera ready for action. We are meek and mild non-combatants and a polite message was sent down that the name and address of the photographer and a written promise of a copy of the picture must preceed the operation. The artist turned out to be a foreigner with but a small knowledge of English; the head donkey-boy who, like the rest of the fraternity, have, perforce, become bad polyglots, and had only half-heard the message, shouted out something that sounded like "verboten" and "défendu" and the artist being familiar with the drastic measures which follow on unlicenced photography of matters military on the Continent, disappeared at the double, only too glad to escape a possible two years' fortress imprisonment.

"A special pilgrimage, of course, was undertaken to the Tomb of the Physicians, where we saw two surgical operations illustrated, one being an operation on a man's toe, and the other the Jewish rite, which is still practised at the present day. The execution, however, is more primitive; the patient stands, and if he is full of fortitude he steadies himself by resting his hand on the head of the operator, who works in a sitting position. Should he be nervous, as one of the figures is represented to be, then two men stand behind and hold his hands away, in the same way as is practised in the wards to-day with the patient in the recumbent position.

"There were other scenes in this tomb over which we let our imagination run riot,

and eventually we came to the conclusion that it must be some out-patient department with people making the time-honoured request for 'medicine for drink and a bottle for rub.'

"We also visited the highly decorated Tombs of Ti and of Mereruka. In harmony with the belief that the soul kept on returning to see how the old corpse was getting on, the rich man of ancient days built very fine and commodious apartments for the safe keeping of his body; the walls were covered with fine pictures carved in stone instead of oil paintings on canvas. Although he did not arrange them according to modern ideas of certain classes of sporting pictures in the smoking-room, the Landseers and other great landscapes in the dining-room, and the water-colours and photographs in the drawing-room, still they are all there and arranged in some sort of order. The artists and decorators played up to the owner's vanity, and produced many life-sized representations of the late lamented, and inset in the lower corner is usually to be found the picture of his wife holding on gently to the calf of his leg with just that charming touch of familiarity suggestive of successful connubial relationship, and indicative perhaps also of the smaller *rôle* that Madame was officially allowed to play in those days in the management of outside affairs.

"Ti seems to have been a good chap and a great sportsman. He is depicted as a shikari chasing the deer with hounds; he is seen as a fisherman catching all sorts of fish that would gladden the hearts of modern piscators, and he also does not appear to have been afraid of the hippos and crocodiles which abounded. He appears to have been a gourmet; extensive arrangements were made for his returning spirit to gloat over all sorts of good things to eat and drink; fat geese, and with it, presumably, *pâté de foie gras*, seem to have been his favourite dish. We revelled in the picture of the geese being fattened, especially those of us who have seen it done at Strassburg. These, and a great many other pictures, arrested our attention and interest, and were perhaps, on the whole, more comprehensible than a lot of subjects exhibited on canvas by modern artists. But enough about pictures! The best of picture galleries at home and abroad may tire one out.

"A visit to Sahkarah is not complete without entering the great Serapeum or Tomb of the Sacred Bulls. Imagine a huge underground passage, into which one could run a train, carved out of the solid rock, with vaults to the right and left, containing the enormous sarcophagi of the deceased bulls, a hot, oppressive atmosphere, and pitch darkness on which our thirty flickering candles made but a faint impression. Someone suggested that this must have been a remnant of one of the plagues called down on Egypt by Moses, and which had not been relieved when they changed plagues. One is perhaps more impressed by this underground monument than by any of the others. One is overcome with a craving for daylight and good modern oxygen, and we recommend our friends with weak hearts to forego this part of the trip.

"Whether it was just the same feeling experienced by the other ordinary mortals present, or whether the sudden discovery of ancestral greatness and antiquity was too much for him, or that he was beckoned to by one of the bovine spirits, the fact remains that Private Bull collapsed, and had to be carried out into the pure air of heaven, where he rapidly and with pleasure accepted twentieth century conditions again and renounced the claim made on him by his sacred ancestors.

"It was nearly 4 o'clock by the time all these places had been inspected, and we had now to think of the homeward journey, a ride of some 12 miles across desert to the Pyramids of the Ghizeh, from which point the tram would take us almost the whole way home. Heading, then, for these classical erections, which looked a very long way off, the column was soon under weigh again.

"The relative merits of the donkeys were now put to the test, men engaged each other in friendly racing contests, saddles slipped, stirrup leathers, or rather strings, got displaced, and several riders fell gently to the ground, the donkeys being too well trained and too tired to think of dragging their fallen riders, but their looks portrayed extreme boredom with just a touch of contempt. In a very short time the party was stretched out over nearly ¾ of a mile of track.

"This could not be allowed in one of the latest organised mounted corps, so the head of the column was halted and the whole party herded together; the donkey-boys forming up in line behind and singing some sort of chant, rather like the sailormen in Bombay harbour, and accentuating the rythme by clapping their hands, set the mokes off at a decent pace, and kept the stragglers up in line with the aid of their sticks.

"Two hours thus on the 'Dingies of the Desert' brought the party face to face with the Sphinx, who looked surprised, but said nothing. Getting clear of her searching gaze the party dismounted, took an affectionate farewell of their poor tired asses,

and leaving the Commanding Officer to deal out largesse to the clamouring donkey-boys, formed fours right and stepped out gaily to the tram terminus.

"The Army was back in barracks by 8 p.m., comfortably tired, thirsty, and none the worse for having been tourists for a day.

"The second party did the same trip on April 3 under similar conditions, except that Mr. O'Farrell assumed dragoman's office *vice* Captain Rahilly, and being new to the job was allowed the use of a Baedeker.

"Mahommed Dodo, Sheikh of the Donkeys, received us at the station with open arms; there was apparently money in this new khaki-coloured caravan Cook, for the donkeys were distinctly better.

"Captain Donajowski, of the Pay Department, accompanied us, and promised to call us 33 Squadron in his accounts in future, so greatly was he impressed with the fine riding. We got him to the bottom of the Persian Shaft and would not allow him out until he had promised never to cut down or delay any money claim sent in by the new squadron; this treaty was ratified at luncheon.

"The weather was very much warmer on this second trip, consequently the beer jar ran dry in a very short time, and an enterprising native, who was selling oranges at Mariette's house, must have had a good day, for the squadron bought up the whole of his supply.

"The squadron hopes to give the canteen fund another squeeze before long, and to do some more sight-seeing."

NOTES FROM HARRISMITH.—Staff-Serjeant W. Grove writes: "A Farewell Smoking Concert was held at the Military Hospital on the evening of March 23, 1910, to wish good-bye and Godspeed to Serjeant-Major E. E. Ward, wife and family. During the evening our Commanding Officer (Major Smithson) was asked to present a souvenir (consisting of a silver tea and coffee service), subscribed for by the Detachment, to Serjeant-Major Ward. The Commanding Officer did so, and spoke of the valuable services of Serjeant-Major Ward, and also of the exceptional manner in which he had carried out his duties during his sojourn here, and wished him and his family a safe passage and success in his new station. Serjeant-Major Ward responded, and thanked the Detachment for the valuable present, and also thanked the N.C.O.'s and men for the ready assistance always rendered him in carrying out his duty. He hoped to meet them again in some other station.

"During the evening numerous songs were sung by Serjeant-Major Ward, Privates Boxall, Hall, Horne, Jarvis, Lynch, Price, Shearman, and Winckworth, Private Morgan, A.S.C., and Mr. Hampton, Expense Accountant.

"Gramophone selections were rendered by Private Biggins on his splendid gramophone. After an enjoyable evening the concert closed by singing 'Auld Lang Syne,' and 'God save the King.'

"Serjeant Major Ward and family left on April 25, to embark at Cape Town on the 28th on s.s. 'Gaika.' Captain Rutherford joined for duty on April 8."

NOTES FROM SIMLA.—Lieutenant-Colonel R. S. F. Henderson, R.A.M.C., Secretary to Principal Medical Officer, His Majesty's Forces in India, writes as follows, under date April 20, 1910:—

"*Appointments.*—Colonel T. J. R. Lucas appointed Principal Medical Officer, Abbottabad and Sialkot Brigades, with effect from February 1, 1910.

"Lieutenant-Colonel E. H. L. Lyndel-Bell appointed Officiating Principal Medical Officer, 7th (Meerut) Division, *vice* Colonel F. B. Maclean, on leave.

"Lieutenant-Colonel J. S. Davidson appointed Officiating Principal Medical Officer, Allahabad and Fyzabad Brigades, *vice* Colonel L. E. Anderson, on leave.

"The following officer has been appointed Honorary Surgeon to His Excellency the Viceroy:—

"Lieutenant-Colonel S. Westcott, C.M.G., *vice* Surgeon-General F. W. Trevor, resigned on promotion to Honorary Surgeon to His Majesty the King.

"Brevet-Colonel R. H. Firth appointed Sanitary Officer, Army Headquarters, from April 1, 1910.

"*Leave.*—Colonel H. J. W. Barrow granted ninety days' privilege leave, with effect from April 8, 1910, pending retirement, with effect from July 8, 1910.

"Colonel F. B. Maclean granted six months' general leave, with effect from May 1, 1910.

"Surgeon-General P. M. Ellis granted an extension of leave on medical certificate, up to April 23, 1910.

"Colonel L. E. Anderson granted six months' general leave in India, with effect from May 2, 1910.

"Lieutenant-Colonel J. Battersby has been granted extension of medical certificate leave from April 2, 1910, to October 1, 1910.

"*Specialists.*—The following officers are appointed specialists in the subject named, with effect from the dates noted against them :—

(*b*) *Dermatology.*—Captain E. V. Aylen, 6th (Poona) Division, from December 4, 1909.

"Captain C. G. Browne, 8th (Lucknow) Division, from November 17, 1909.

"*Prevention of Disease.*—Captain R. J. Cahill, Madras, from March 21, 1910.

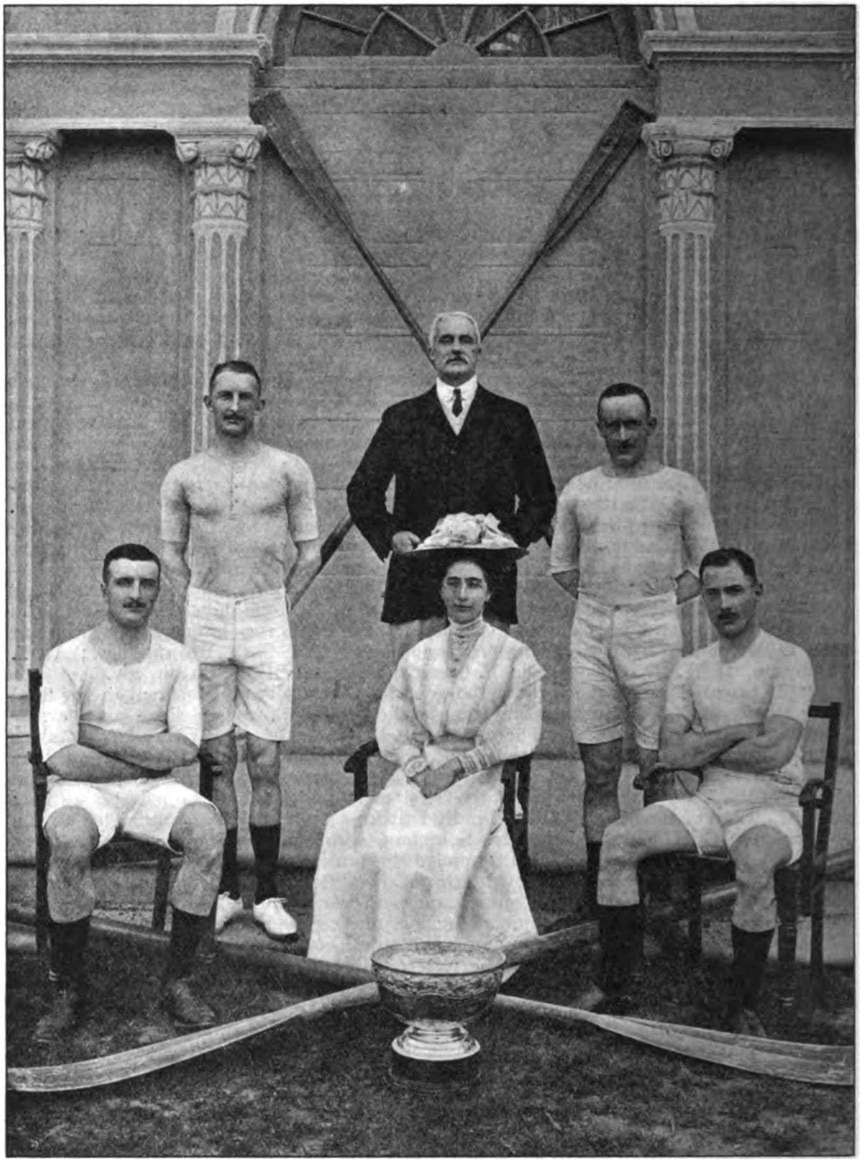
"Captain C. Scaife, Colaba, from March 25, 1910."

NOTES FROM LUCKNOW.—Lieutenant-Colonel H. N. Thompson writes: "The Lucknow cold weather season may be said to have finished up with the annual Regatta, which was spread over three afternoons, viz., March 3, 4 and 5, when the reach of the old Gumti, from the Iron Bridge to "the Chutter," was *en fête* and gay with bunting, especially the end near "the Chutter," where were assembled all the fair and brave: and tea, drinks, and ices were to be had in profusion. The two chief events were the 'Challenge Fours' and 'Challenge Pairs,' open to corps, regiments, or crews composed of members of any Service. For the second year in succession the large challenge cup for the fours, originally presented by the 18th Hussars, was carried off by the Royal Army Medical Corps. We rowed two preliminary heats; the first was won against the P.W.D. by half a length, after a very hard race in which our opponents led most of the way. In the second heat we had rather an easy victory over the 74th Punjabis. The final heat, between the Royal Army Medical Corps and the combined Royal Horse Artillery and Royal Field Artillery, took place on the third day. Up to the moment of starting favouritism rather inclined to the gunners, as, led by that accomplished and powerful oarsman, R. H. Sanderson, they had shown excellent form in their race *v.* the Royal Engineers. The actual race resulted in a neck-and-neck struggle for three-quarters of the course. The careful training and untiring practice which the Royal Army Medical Corps had undergone then began to tell, and our crew finally won by a clear length, thus retaining the very handsome bowl on our mess table for another year. The crew was as follows: C. G. Browne, bow; W. I. Thompson, 2; W. R. Blackwell, 3; F. Casement, stroke; Mrs. Grattan, cox.

"The Royal Engineer pair proved too good for Blackwell and Casement in the final of the Challenge Pairs, thus wresting from us the cup which we held since last year.

"Our junior pair, however, Thompson and Browne, successfully turned the tables on the Royal Engineers second pair and won easily in the final, steered by Miss Mactavish, Q.A.M.N.S.I. On the second day, Lieutenant-Colonel Thompson and officers of the Royal Army Medical Corps were 'at home,' and entertained the station; while the band of the 'King's Own,' kindly lent for the occasion, greatly added to the enjoyment. On the final day, Mrs. Saunders, wife of our Commissioner, was 'at home,' and the band of the H.L.I. supplied the music. In the evening, the usual Regatta dinner was given at the Royal Army Medical Corps Mess, when thirty-three sat down. A loving cup was passed round, and both wine and eloquence flowed freely. The joy was chastened by the approaching loss of R. H. Sanderson, who has done so much to keep rowing alive here, and to show to all comers how this sport should be carried on, both in the spirit and the letter. He had a great reception, was carried shoulder high round the mess and cheered to the echo. Thus ended a most successful regatta, splendidly run by our colleague, C. G. Browne, Hon. Secretary.

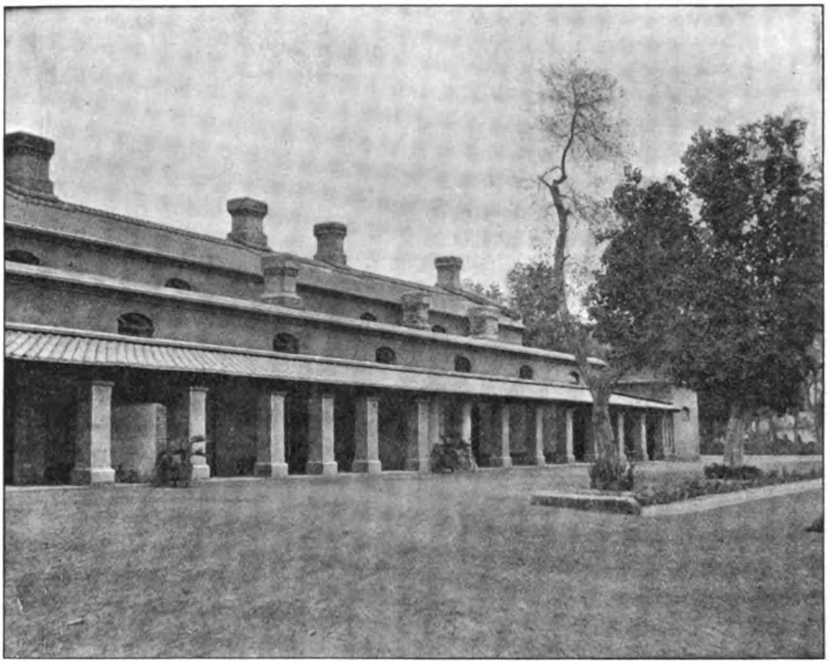
"The mess has been very full all this cold weather, made up of many honorary members and several classes of young officers, both Royal Army Medical Corps and Indian Medical Service, for the 7th and 8th Divisions. I think these classes are the greatest boon to young officers, not only for the hints on sanitation which they may pick up, but because it gives them a chance of beginning their Indian career comfortably and in confidence, gradually picking up knowledge about life in this country and how things should be done, both socially and officially. Altogether, fourteen Royal Army Medical Corps officers and eleven Indian Medical Service, have passed through our hands this cold season; of these, Gregg and Walker have been fortunate enough to be permanently posted here to fill two vacancies. In the old days, when everything had to be found out for oneself, sometimes after unpleasant experiences, how one would have valued such a month's instruction as the medical youth now obtains! The mess has to regret the loss of Major McDermott, second in command and divisional eye specialist, who has left us, time expired. He always proved himself



Lieut.-Col. H. N. Thompson (coach).
W. I. Thompson (2). W. R. Blackwell (3)
F. Casement (stroke). Mrs. Grattan (cox.). C. G. Browne (bow).

a true sportsman, and, with the help of his good mare 'Melody,' his dull cherry jacket was often carried to victory. A fine collection of heads, the result of his many sporting trips, and generously presented by him, now adorns the walls of the mess. We are all sorry to learn that our Principal Medical Officer, Surgeon-General Ellis, has finally decided not to return to India on account of ill-health. Lucknow has a curiously evil reputation as regards the health of Principal Medical Officers breaking down, though all other ranks seem to thrive well here."

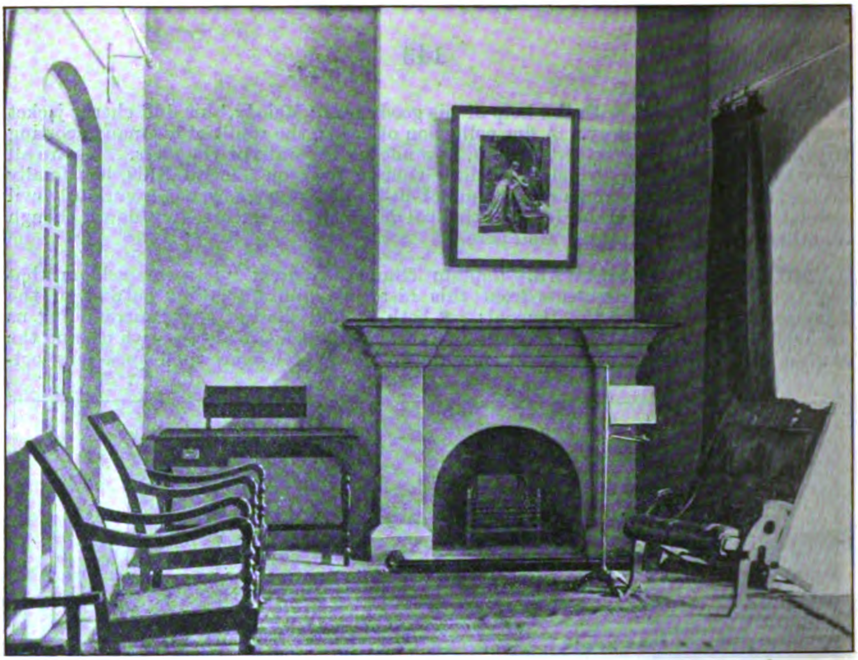
NOTES FROM PESHAWAR.—Captain Thurston writes: "It seems seldom that any news of Corps movements from this historical and important outpost of the Empire finds a place in the Journal; yet both we and the hill tribes surrounding us are very far removed from lethargy and inactivity. Raiders are always with us, and the lawless behaviour of these constant 'pinprickers' have been aggravated by serious loot-



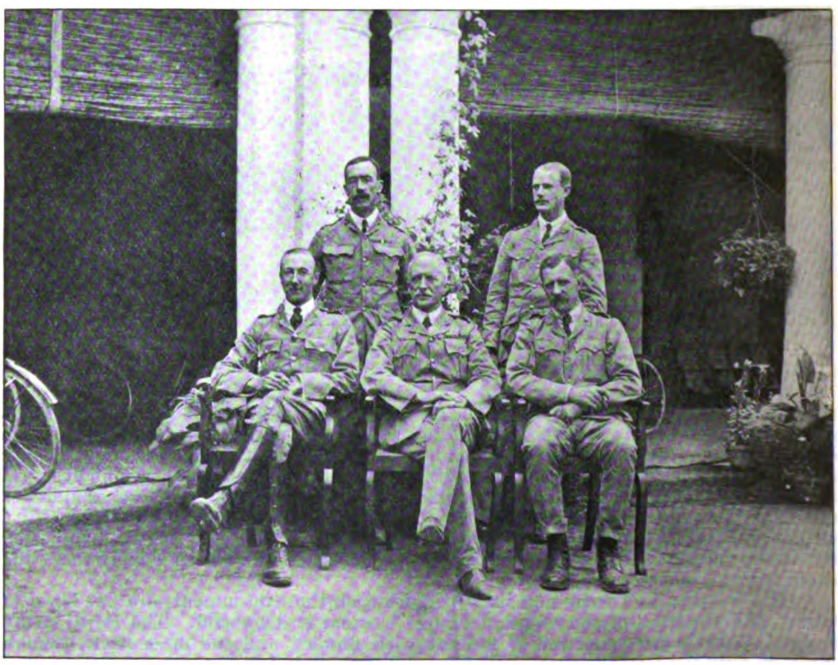
The Officers' Block, Station Hospital, Peshawar.

ing in Peshawar City, originating in the cast prejudices of Mussulman and Hindu. It appears that the 'holy' of the Hindus, a time of festivity, clashed with the 'Bara Wafât' of the Mussulman's, a time of mourning; this resulted in very high feeling, necessitating the city being picketted by British troops, but only after several lives had been lost and much loss of property incurred amongst the Hindus, the weaker and less numerous party. Loot to a Pathan is like honey to the bee; and Peshawar City naturally attracted numbers of these wild hillmen. The frontier being a smouldering fire, the accidental death of one of these freebooters might have been a spark to set the whole frontier aflame.

"The weather, as I write now, is still quite cool, the cantonments are one blaze of flower, and the smell of the rose and orange blossom is delightful. The Royal Army Medical Corps mess compound is radiant with flowers, and the mess itself, though small, is very comfortable, excellently run, and extremely handy to the hospital. The staff here consists nominally of seven officers and one reserve; the latter has not been seen for some time. But with Major Whitestone, R.A.M.C., now permanently



Interior of one of the Dining Rooms, Officers' Wards.



Some of the R.A.M.C. Staff, Peshawar (outside the Mess Building).

Lieut. J. A. Renshaw, R.A.M.C. Capt. A. C. Chopping, R.A.M.C.

Capt. J. G. Churton, R.A.M.C. Lieut.-Col. B. M. Skinner, M.V.O., R.A.M.C. Capt. L. V. Thurston, R.A.M.C.

appointed as staff officer for medical mobilisation in this division, and one or two honorary members, we usually have a workable and cheery membership.

"During the last few months there have been several changes. Captain C. W. O'Brien has left for Aden, his place being ably taken by Captain J. G. Churton, our new specialist in operative surgery.

"Lieutenant-Colonel Skinner, M.V.O., our Commanding Officer, and Captain Chopping proceed to England on three months' privilege leave shortly; the latter is our hardworking and capable honorary secretary, in addition to his onerous post of staff-surgeon.

"Captain L. V. Thurston, R.A.M.C., arrived last November from Jubbulpore, *vice* Captain Cahill, transferred to Bangalore, and proceeds to Khauspar Murree Hills, as Officer Commanding Hospital, in a few days' time; Lieutenant Renshaw, after finishing his sanitary course at Rawal Pindi, arrived last November for duty.

"Our Principal Medical Officer (Colonel Beatson, Indian Service) vacates his appointment in June next, and it is rumoured that he will be succeeded by an Army Medical Service officer.

"New officer's wards have just been completed at the Station Hospital, on plans drawn out by Colonel Skinner, who has also been instrumental in having the work accomplished in so short a time. Their accommodation and structure are on quite a new basis, and let us hope that they will be the harbinger of a new era in providing suitable wards for sick officers. There are four separate wards for general cases, each with its own bath-room and a common dining-room and service-room, in addition; there are two other large wards, one of which is for the accommodation of four enteric patients, and the other for cases requiring isolation. The bow windows and seats, and the whole *tout ensemble* remind one more of a European than an Indian building. There is also a separate cookhouse for sick officers' use only, fitted up with the latest inventions and improvements. The health of the British troops has been remarkable, and this year it bids fair to equal, and, we hope, surpass, 1904, which was one of the healthiest known in Peshawar. There has been no case of enteric fever originating in Peshawar for nine months. Turning to the lighter side, the season here has been gay, and it is the wish of our energetic General Officer Commanding to create a 'Peshawar' Christmas week of a brilliancy and magnitude second to none, but Lahore during this festive season will be hard to defeat.

"The Peshawar Vale Hounds have finished running, and on the 13th inst. the hunt ball takes place, at which their excellencies the Viceroy and Countess Minto have accepted an invitation to be present.

"The Royal Army Medical Corps made good efforts to win both the Punjab commission and the Jamebsee Cup. The Royal Army Medical Corps from Peshawar provided several members to the teams. We did very well for a first endeavour, and next cold weather, with a sounder 'bunderbust,' stand a good chance of winning.

"The divisional manœuvres were of a strenuous nature, and terminated in combined field firing by the whole division, happily without accident.

SPECIAL RESERVE OF OFFICERS.

ROYAL ARMY MEDICAL CORPS.

The undermentioned Lieutenants (on probation) are confirmed in that rank: George Rollason, William Hilgrove Leslie McCarthy, M.B., Ian Dunbar Dickson, John McGregor Scott, Thomas Errol Guthrie, William Thomson Graham, Charles Stewart Sandeman.

Edward Torriano Holland to be Lieutenant (on probation), dated March 28, 1910.

Duncan Macfadyen, M.B., to be Lieutenant (on probation), dated February 26, 1910.

TERRITORIAL FORCE.

ROYAL ARMY MEDICAL CORPS.

3rd East Anglican Field Ambulance.—Major and Honorary Surgeon-Lieutenant-Colonel Harry Thornton Challis, M.D., from the list of officers attached to units other than medical units, to be Major, with the honorary rank of Surgeon-Lieutenant-Colonel, dated February 1, 1910.

Attached to Units other than Medical Units.

Lieutenant John Allan, M.B., to be Captain, dated October 7, 1909.

Lieutenant Horatio W. A. Cowan, M.B., resigns his commission, dated February 23, 1910.

1st *South Midland Field Ambulance.*—**Edward James Broome, M.B., to be** Lieutenant, dated February 19, 1910.

1st *Scottish General Hospital.*—Captain Peter Mitchell, M.D., from the 1st Highland Field Ambulance, Royal Army Medical Corps, to be Captain, dated February 1, 1910.

Captain Peter Mitchell, M.D., to be Major, dated April 2, 1910.

3rd *Southern General Hospital.*—Joseph Charles Symonds to be Quartermaster, with the honorary rank of Lieutenant, dated March 1, 1910.

For attachment to Units other than Medical Units.

Thomas Hamilton Ward, M.D., to be Lieutenant, dated March 1, 1910.

Lionel Henry Moiser, M.B., to be Lieutenant, dated March 11, 1910.

4th *Northern General Hospital.*—Captain Francis B. Cooper, M.B., resigns his commission, dated September 24, 1909.

Frank Alcock, M.D., to be Captain, whose services will be available on mobilisation, dated February 14, 1910.

For attachment to Units other than Medical Units.

William Townsend Storrs to be Lieutenant, dated February 21, 1910.

Surgeon-Captain Frederick William Johnson, M.B., from the 8th Battalion the Sherwood Foresters (Nottinghamshire and Derbyshire Regiment), to be Captain, with precedence as from August 4, 1906, dated February 25, 1910.

Attached to Units other than Medical Units.

Lieutenant Walter G. Paget to be Captain, dated February 25, 1910.

2nd *South-Western Mounted Brigade Field Ambulance.*—Kenneth Clegram Goodman to be Transport Officer, with the honorary rank of Lieutenant, dated March 24, 1910.

2nd *Wessex Field Ambulance.*—Major Alfred B. Soltau, M.D., to be Lieutenant-Colonel, dated April 1, 1910.

1st *Northern General Hospital.*—Frederick Charles Pybus, M.B., F.R.C.S.Eng., to be Captain, whose services will be available on mobilisation, dated March 17, 1910.

For attachment to Units other than Medical Units.

Robert Neilson Wallace, M.B., to be Lieutenant, dated March 19, 1910.

Attached to Units other than Medical Units.

Lieutenant John McWatt, M.B., resigns his commission, dated February 23, 1910.

Captain Thomas Evelyn Fielding, M.B., Royal Army Medical Corps, to be an Adjutant of a School of Instruction, dated April 2, 1910.

ROYAL ARMY MEDICAL CORPS.

Welsh Border Mounted Brigade Field Ambulance.—Lieutenant William Smith, from the Eastern Mounted Brigade Field Ambulance, Royal Army Medical Corps, to be Lieutenant, dated March 1, 1910.

1st *East Lancashire Field Ambulance.*—Joseph Marshall Postlethwaite to be Lieutenant, dated February 2, 1910.

Lieutenant Cecil W. Hutt resigns his commission, dated March 31, 1910.

3rd *East Lancashire Field Ambulance.*—Henry Herbert Rayner, M.B., F.R.C.S. Eng., to be Lieutenant, dated February 3, 1910.

1st *Southern General Hospital.*—Major Robert M. Simon, M.D., to be Lieutenant-Colonel, dated August 5, 1909.

Captain James W. Russell, M.D., to be Major, dated August 5, 1909.

2nd *Home Counties Field Ambulance.*—George William Harris to be Quartermaster, with the honorary rank of Lieutenant, dated April 6, 1910.

1st *Lowland Field Ambulance.*—Lieutenant Archibald Jubb, M.D., resigns his commission, dated February 22, 1910.

2nd *Wessex Field Ambulance.*—Frederick James Miller to be Transport Officer, with the honorary rank of Lieutenant, dated May 14, 1910.

For attachment to Units other than Medical Units.

Ernest William Reed, M.B., to be Lieutenant, dated March 19, 1910.

Frank Miller Bingham to be Lieutenant, dated March 24, 1910.

William Charles Frederick Harland, M.B., to be Lieutenant, dated April 6, 1910.

Attached to Units other than Medical Units.

Lieutenant Edward F. MacL. Neave, M.D., to be Captain, dated July 14, 1908.
Lieutenant David R. Taylor to be Captain, dated February 18, 1910.
Lieutenant Arthur H. Faulkner resigns his commission, dated March 24, 1910.
Lieutenant John H. P. Paton, M.B., resigns his commission, dated March 31, 1910.
Lieutenant Arthur Innes to be Captain, dated April 10, 1910.

The King has been graciously pleased to confer the Territorial Decoration upon the undermentioned officers of the Territorial Force who have been duly recommended for the same under the terms of the Royal Warrant, dated August 17, 1908:—

Lanarkshire Yeomanry.—Surgeon-Lieutenant-Colonel Russell Eliott Wood.

3rd East Lancashire Brigade, Royal Field Artillery.—Surgeon-Major Alexander Cosgrave.

Royal Army Medical Corps.—Major John Bourne Berry, attached to 3rd Home Counties (Cinque Ports) Brigade, Royal Field Artillery. Major William Bertie Mackay, M.D., attached to 7th Battalion the Northumberland Fusiliers. Major Robert Stirling, M.D., attached to 6th (Perthshire) Battalion the Black Watch (Royal Highlanders.

NOTES FROM THE 2ND HOME COUNTIES FIELD AMBULANCE.—The 2nd Home Counties Field Ambulance, of which Major A. R. Henchley is the popular commandant, held a very enjoyable conversazione and presentation of prizes at the St. George's Hall, on Thursday, May 5.

Major A. R. Henchley presided over a large attendance, being supported by Surgeon-General W. L. Gubbins, C.B., M.V.O., K.H.P. (Director-General Army Medical Service), the Mayor of Canterbury (Alderman F. Bennett-Goldney), Sir Somers Vine, C.M.G., Captain Emerson, Lieutenants Willan and Dundas, Captain Hamilton, Captain Kingsford, Dr. Duke, Rev. J. Le Mare Shallis (Chaplain), &c.

Major Henchley, during an interval, said they had now come to the pleasant and interesting part of the programme, when the prizes would be presented for the field ambulance work done. In addition to that they also had the presentation of awards for the railway classes, which had been held by himself in connection with the St. John Ambulance Association. That night they were honoured with the presence of the Director-General of the Army Medical Service—General Gubbins—who had been interested most keenly in the Red Cross work of the civilian and auxiliary forces of the Empire for many years past. Probably some of those present that evening were not aware of the position of the Field Ambulance. They were in the happy position of being complete in establishment of N.C.O.'s as well as men, and very nearly so in regard to officers. This had been so from the completion of the first Territorial year right up to the present date. That happy circumstance was one which they and Canterbury—and he could say this in the presence of the Mayor of Canterbury—were distinctly proud. Their establishment of N.C.O.'s and men was 210, and their numbers were 250. The odd or over numbers were made up of what was known as category B of the Special Reserve. They had from time to time lost a certain number of their members, although they had not been lost to the Imperial Forces of the Empire, these having gone into either the Navy or regular Army, or Special Reserve. One of the remarks we often heard made was that the age of the Territorial Force was somewhat young, but he was quite sure of this, that they would agree that one of the strongest features was to have young men in the Territorial Forces. Although there might be there that night some who were not exactly young, he was sure they would not be vexed with him when he said it was not so easy to learn when older as when young. They in Canterbury were distinctly proud of their combined position in the Territorial movement, not only in regard to numbers but as to the quality of the men. His colleague, might he say, in the Territorial service, Captain Kingsford, had done extraordinarily well in this respect. He got the full strength of his company, and had assisted other companies by helping them up in numbers from Canterbury. In addition to that, they had Captain Bell with his junior division of the Officers' Training Corps at the King's School, who could supply gaps in the commissioned ranks. It had been said that the Territorial Force as such was the last word in the voluntary methods of military service in that country. He was sure they would all agree with him, that if that were the case then they were not going to have conscription. The Territorial Force was such as the voluntary forces of that country had never been before, because it was equal to 90 per cent. of the establishment of officers and men. He was quite sure they would agree with him that, as it had been recognised in times past, so he hoped it would be recognised in times to come, that one volunteer was better than a dozen pressed men. During

the last five years, or it might be a little more, a new era had been opened up in the matter of Imperial defence and the Colonies, by raising a Territorial Force in much the same way as they were doing in Great Britain. The methods which they as Britishers adopted was for defence and not defiance, and he thought it was only just and right that they should recognise—as had been recognised, he had no doubt, throughout the whole British Empire—that the man who was responsible for all this, and to whom all honour was due, was Mr. Haldane. Now, if he might leave the Army part of the programme, he would like to refer in a few words to the St. John Ambulance Association. The St. John Ambulance Association was the ambulance department of the Order of St. John of Jerusalem in England. The Order of St. John of Jerusalem in England was the linking up of the olden time Hospitallers and Crusaders to present times. This ambulance department was, he believed, about thirty years old. It was a wonderful and remarkable organisation, and purely voluntary in its efforts; its wings spread as far apart as the great and glorious Empire of India on the one hand, and its Sister of the Snows, Canada, on the other; and in the South from the Australasian Colonies to that more recent British acquirement, the great and glorious Colony of South Africa. The object of the Association was to encourage and instruct the people of the country in the methods of what was known as First Aid to the sick and injured. The plan which was adopted was to get a medical man, whether in military or civilian departments of the medical profession, to hold classes from time to time, and then, after a series of lectures, the candidates went up for an examination. The certificate holders of that Association were now numbered not by hundreds or thousands, or hundreds of thousands, but by millions throughout the whole British Empire, and in every part of its dependencies, and he was sure it was with the greatest of pleasure they received that night the members of the South Eastern and Chatham Railway, who were to receive their awards at the hands of the Director-General. Should anyone meet with an accident when travelling on any of the great railways to-day they could be sure of receiving at once treatment which would be little, if anything, short of medical skill, and he was sure the railway employee would be the first to recognise the splendid way in which the railway directors seconded their efforts.

Director-General Gubbins then presented the various awards as follows:—

Canterbury.—General proficiency and attendance—(1) Bugler W. Nowers, (2) Corporal W. Jenkins, (3) Private R. G. Smith. Individual work: (1) Private H. Martin, (2) Bugler W. Nowers. N.C.O.'s competition: (1) Staff-Serjeant F. E. Smith, (2) Staff-Serjeant A. Rawson, (3) Serjeant W. Sharpe. Transport Section: (1) Serjeant E. Rigden; (2) Driver A Pearce; (3) Driver B. Parry; (4) Driver S. R. Tremlett. Attendance and proficiency in bugle band: (1) Private R. G. Smith; (2) Private G. Constable and Private S. Beaumont.

Ashford.—General proficiency and attendance: (1) Corporal D. O. Mather; (2) Private F. Flavin. Individual work: (1) Lance-Corporal A. C. Green; (2) Private H. J. Longhurst.

Whitstable.—General proficiency and attendance: (1) Corporal W. Grantham. ndividual work: (1) Staff-Serjeant P. E. Jackson; (2) Corporal W. H. Grantham; (3) Private W. Hammond (973).

Canterbury.—Stretcher squad competitions: (1) Corporal W. Jenkins, Private J. T. Hadlow, Private A. Hatson, Private T. Holness; (2) Staff-Serjeant F. Smith, Private R. G. Smith, Private H. B. Martin, Bugler W. Nowers.

Ashford.—Stretcher squad competition: (1) Corporal D. G. Mather, Private A. J. Adams, Private C. W. Jones, Private V. Wilding; (2) Serjeant A. H. Kirkness, Private W. Fuller, Private R. C. Vibert, Private H. J. Longhurst.

Whitstable.—Stretcher squad competitions: (1) Staff-Serjeant P. E. Jackson, Private H. Foad, Private H. Hunt, Lance-Corporal H. Leney; (2) Corporal W. Grantham, Private F. Hockliss, Private W. Hammand, Private E. J. Bright.

At the conclusion of the presentation, General Gubbins expressed the pleasure it gave him to be present that evening to give away the awards, but also in order that he might show his appreciation of the work which was being done in Canterbury, and to take the opportunity of renewing his acquaintance with his old friend Major Henchley. The General went on to refer to the glorious military history of the County of Kent, and alluded to the claims of the men of Kent in olden days to take their places in the van of the Army. In turn he spoke of the exploit of the celebrated Jack Cade, who entered London at the head of 70,000 men, and to the memorable action of Sir George Oxenden in 1746, when he raised in one week 6,000 men fully equipped and provisioned to meet the dangers of the Scottish and French invasion. Then in 1803 the County raised a very large force to meet the threatened invasion of Napoleon, and one of the

units of that force was the Cinque Ports force commanded by William Pitt, the Prime Minister, who thus, in addition to his arduous duties as Prime Minister, found time to look after his corps. Speaking of the volunteer movement, General Gubbins said it had gone through various phases since its inception, until two years ago when Mr. Haldane introduced his great Territorial scheme. Anyone who was acquainted with the volunteers of the old days would be at one in asserting that the Territorial Force were as good as 100 of the old volunteer force. But what they were interested in there that night was the medical branch of the Territorial Force, and the weak point of the old volunteers was that there was practically no medical organisation, whereas to-day the medical corps was a part and parcel of every division in the country. He was very glad to hear Major Henchley say that the Field Ambulance was at over-strength, and he was also very much interested in seeing the St. John Ambulance men there. He had always taken a great interest in the St. John Ambulance men, and he was instrumental to a great extent in getting them brought into touch with the War Office just before the South African War. During that war the Order supplied no fewer than 1,900 men, and he could bear testimony to the fact that after they had had a little licking into shape they were a really admirable lot, and he could never wish for better. If they were ever in difficulties again he hoped the St. John Ambulance men would come forward as they had done before. In conclusion, the General referred to the splendid every-day practical use of ambulance work on railways, and alluded to the work of the Red Cross Society generally in most appreciative terms, giving as it did an opportunity to the women to come into line and show their patriotism. Although they are still far behind Continental nations, their country might be said to have now woke up to a sense of its possibilities, and he trusted that the 2nd Home Counties Field Ambulance Corps would maintain the high state of efficiency of which it was at present so proud.

Subsequently, the customary votes of thanks were accorded to the Director-General and to Major Henchley for presiding.

The very admirable programme of the evening was well received, those contributing being: Miss Horsley, Miss Goad, Miss Doris Bright, Miss Ebelyn Kidder, Mr. Clement Hill, Dr. Duke, Mr. Ward (Ashford), Mr. Edginton, the Band of the 21st (E. of I.) Lancers, by kind permission of Colonel Kenna, V.C., A.D.C.

During an interval light refreshments were handed round by the members of the Royal Army Medical Corps (Territorial), and a thoroughly enjoyable and instructive evening was experienced.

QUEEN ALEXANDRA'S IMPERIAL MILITARY NURSING SERVICE.

The following ladies have received appointments as Staff Nurses: Miss G. Parkes, Miss M. Warburton, Miss J. L. Blakely, Miss D. C. Isaacson, Miss E. M, Collins, Miss G. D. Morris.

Postings and Transfers.—Sisters: Miss M. Pedler, to Cairo, from Gibraltar; Miss H. M. E. Macartney, to Malta, from Cairo; Miss K. Roscoe, to Gibraltar, from Cairo; Miss H. Hartigan, to Cairo, from Malta; Miss M. M. Bond, to Woolwich, from Cambridge Hospital, Aldershot. Staff-Nurses: Miss G. Parkes, to Woolwich, on appointment; Miss M. Warburton, to London, on appointment; Miss M. McBride, to Curragh, from Woolwich; Miss E. M. Collins, to Tidworth, on appointment; Miss G. D. Morris, to London, on appointment.

Appointments Confirmed.—Staff Nurses: Miss A. G. Airey, Miss M. Clayden, Miss G. A. J. Lloyd, Miss M. Schafer, Miss D. A. Scott, Miss G. E. Stewart.

ROYAL ARMY MEDICAL COLLEGE.

Examination of Captains for Promotion to Major.

State Medicine. (Special Subject.) First written.—Thursday, April 28, 1910. From 2.30 to 5.30 p.m.

(1) Starting from the left-hand side of the three diagrams before you, describe the significance of the features shown, and note points, visible or probable, of interest to a body of troops destined to occupy the area shown for one or more days.

(2) The headquarters of the division to which you belong is situated at the point indicated to you on the map, no unit being more than 5 miles from headquarters. Write an appreciation of the sanitary situation generally, and in respect of each place you propose to occupy.

State Medicine. Second written.—Friday, April 29, 1910. From 10 a.m. to 1 p.m.

(1) Discuss the subject of ablution in barracks, and state what allowance of baths, and of what class, you would consider necessary per cent. of strength in this country.

(2) What are the principles which would guide you in rejecting meat at the ration stand as unfit for issue? How would you determine the existence of tuberculosis in a dressed carcase?

(3) You are sanitary officer of a division on service, and are proceeding in advance with the billeting party. You are asked by the General Staff Officer to say, offhand and roughly, how many men you could place in a certain village, which is pointed out to you from a hill, the village being well below you and half a mile or so distant. What are the chief sanitary difficulties which are likely to arise in connection with the billeting system?

(4) You are ordered, as sanitary officer, to give a course of six lectures, of one hour each, to the staff and regimental officers at your headquarter station. Draw up a syllabus of your course with a short *précis* of each lecture, showing the length of time you would allocate to each branch of your subject, and giving your reasons for such allocation.

Practical State Medicine. (First Day.)– Thursday, April 28, 1910. From 10 a.m. to 1 p.m.

(1) Commence the bacteriological examination of the material before you, and leave the results of your work in the incubator.

(2) The beer before you has been six months in the hospital steward's store. Give an opinion as to the desirability of its issue to patients in hospital, with your reasons, and as to the probability of its having been up to the contract original wort of 1045 S.G.

Practical State Medicine. (Second Day.)—Saturday, April 30, 1910. From 10 a.m. to 1 p.m.

(1) Continue the bacteriological examination of yesterday, and replace in the incubator, having marked your work with your number.

(2) Examine the sample before you as to its fitness for issue to patients in hospital. If preservative is present ascertain the amount.

Physical Training, Work, Food, Clothing, and Equipment of the Soldier: (Special Subject.) Written.—Wednesday, April 27, 1910. From 10 a.m. to 1 p.m.

[N.B.—Only four questions are to be answered. Nos. 1 and 2 must be answered.]

(1) Write a reasoned criticism, from the anatomical and physiological aspects, of "heaving" and "span-bending" exercises, illustrating your remarks by your own experience in the gymnasium. (12 marks.)

(2) You are asked to advise as to the physical training of an infantry brigade composed of Territorials, drawn from the small shop-keeping and artisan class of a manufacturing town. It is desired to get them fit to take the field in six weeks, and, as they are fairly proficient as regards drill and musketry, it is decided to leave six hours a day available for physical training. Sketch a syllabus of training showing the class of exercises to which you would pay chief attention, and also what amount of time you would spend in the gymnasium and how much outside. How would you detect men who proved unable to persist in the course of training, and those who were at the start unlikely to become efficient soldiers in the field? (12 marks.)

(3) It is decided to have a sliding scale of rations to meet varying situations. The rations will consist of certain fixed articles as a basis, but in the higher scales fresh articles may be added, and the quantities of others increased. There are to be three scales: (1) for men in camp; (2) for men on the march; and (3) for men undergoing extraordinary exertions or exposed to severe cold. Give the various foodstuffs that you would use, and the quantities. State what energy value you would legislate for on each scale. (8 marks.)

(The present British ration may be taken as a basis.)

(4) Compare and criticise the two foreign equipments before you in relation to each other and to the new web equipment. Suggest points (if any) which might be taken from either of the first two to improve the last named. (8 marks.)

(5) Discuss the different ways in which the circulatory apparatus responds to the requirements of muscular work. How is this accommodation affected by training, and what light does this throw on disordered action of the heart in soldiers? (8 marks.)

(6) A soldier on a long march loses a certain amount of weight. What is the significance of this fact, and what bearing has it on march discipline? (8 marks.)

Bacteriology. (Special Subject.) Written Examination.—Thursday, April 28, 1910. From 2.30 to 5.30 p.m.

(1) Describe the mode of preparation of the different forms of tuberculin which have been employed for diagnostic or therapeutic purposes in man. What method would you employ for the detection of tubercle bacilli in a sputum in which they are rare?

(2) An outbreak of disease, suspected to be due to meat poisoning, occurs in a regiment. Describe the steps you would take to elucidate the cause of the condition. What bacteria might be responsible for such an outbreak? Describe their characters.

(3) What are the features by which the Fasciolidæ are distinguished from the other families of Trematoda parasitic in man? Describe the eggs of the following parasites, and state in what part of the human organism they may be found: (*a*) *Clonorchis sinensis;* (*b*) *Paragonimus westermani;* (*c*) *Dicrocœlium lanceatum;* (*d*) *Schistosomum hæmatobium;* (*e*) *Schistosomum cattoi.*

(4) Discuss the value to be attached to the determination of the opsonic index in the diagnosis and treatment of disease. Without describing the technique in detail, indicate the precautions to be observed: (*a*) In making opsonic observations; (*b*) in interpreting these observations.

Bacteriology. (Special Subject.) Practical Examination. First day.—Thursday, April 28, 1910. From 10 a.m to 1 p.m.

(1) Make a direct examination of the pathological secretion provided, and write an account of what you have found, leaving your stained specimens for examination. Make cultures from the material with a view to the isolation and identification of the micro-organisms present. Label your plates or tubes, and state which incubator you wish them to be put into.

(2) Examine the paraffin section by various staining methods with a view to the demonstration of any micro-organism which may be present. Leave your specimens for examination and describe in your paper what you have noted as to the nature of the tissue, and the presence or absence of bacteria or protozoa.

(3) Stain and examine the blood film provided, and report upon the probable nature of the case from which it was taken. Leave your film in focus under your oil-immersion lens.

Ophthalmology. (Special Subject.) Written.—Friday, April 29, 1910. From 10 a.m. to 1 p.m.

(1) Describe the symptoms and possible complications of "watery eye." Discuss the pathology and treatment.

(2) Describe the symptoms, course, and prognosis of iridocyclitis. Discuss the pathology and treatment.

(3) What eye lesions occur in rheumatism—(*a*) acute; (*b*) chronic? Describe the symptoms, pathology and treatment.

Bacteriology. (Special Subject.) Practical Examination. Second day.—Friday, April 29, 1910. From 10 a.m. to 1 p.m.

(1) Examine the cultures which you made yesterday from the pathological secretion and describe in your paper the various steps which you have taken, and the results of your examination, including your opinions as to the nature of the organisms which you have isolated. Leave stained films of the different organisms beside your microscope.

(2) Make a careful examination of the stained slides given to you, and describe what you have found in them.

(3) The sample of fæces marked with your number is suspected to contain the eggs of intestinal parasites. Examine it from this point of view and report in your paper the results of your search.

(4) Oral examination.

Dermatology and Venereal Diseases. (Special Subject.) Written.—Thurday, April 28, 1910. From 2.30 to 5.30 p.m.

(1) Discuss the various advantages and disadvantages of the different methods of treating syphilis.

(2) What is meant by impetigo? Give the differential diagnosis of the various forms of disease grouped under this name.

(3) Give the differential diagnosis between lupus, syphilis and malignant new growths of the skin.

(4) Give a description of the skin eruptions which may be caused by the ingestion of the bromides and iodides.

Midwifery and Gynæcology (Special Subject.) Written.—Thursday, April 28, 1910. From 2 to 5 p.m.

(1) How do you ascertain the position and presentation of the fœtus *in utero* at the end of pregnancy?

(2) Describe your management of a face presentation in the following circumstances;

the os is dilated to three-fifths of its full size; the membranes have recently ruptured; the pelvis is normal; the chin is behind and to the right.

(3) Give the treatment of a case of placenta prævia at the eight month in which a flooding has recently occurred, the cervical canal admits one finger, and labour has not commenced.

(4) What are the indications for the use of the curette? How would you prepare a patient for the operation of curettage? What are its dangers?

(5) Give the causes and describe the chief clinical varieties of prolapse of the uterus, and give the treatment appropriate to each.

(6) A woman, aged 63, has a tumour of pelvic origin, which has been known to exist for three years. It is hard, smooth, and freely movable in the abdomen, and of the size of a cocoanut. On vaginal examination it can be felt behind and to the right of the uterus, which is freely movable and not enlarged. There is a large quantity of free fluid in the abdomen. Discuss the diagnosis and treatment of this case.

Otology, including Rhinology and Laryngology. (Special Subject.) Written.—Thursday, April 28, 1910. From 10 a.m. to 1 p.m.

(1) Describe the signs and symptoms of septic thrombosis of the lateral sinus, complicating middle ear suppuration, and the treatment which you would adopt.

(2) Describe the symptoms, diagnosis, and treatment of acute furunculosis of the external auditory meatus.

(3) What is the structure of a mucous polypus of the nose? From what parts of the nasal cavity do these growths usually originate? State what you know of the etiology of mucous polypi.

(4) What abnormal appearances in the larynx would lead you to suspect tuberculous disease in the early stage?

(5) Describe the symptoms, diagnosis, and treatment of acute inflammation of the frontal sinus.

(6) Mention the conditions which most often give rise to hoarseness of voice (*a*) in children; (*b*) in young adults.

Examination of Lieutenants, Royal Army Medical Corps and Indian Medical Service, at the close of the First Session, 1910.

Hygiene. Written Examination.—Monday, April 25, 1910. From 10 a.m. to 1 p.m.

(1) What do you understand by the term "purification of water"? How is this effected on a large scale?

(2) Define "disinfection." What do you understand by the terms "saturated steam" and "superheated steam"? And how are these forms of steam made use of in a high-pressure disinfector, such as the Washington Lyons?

(3) What is a "food"? What is the process of assimilation and metabolism in the case of proteids? What do you understand by the term "Nitrogenous equilibrium"? and how is it affected by the quantity of proteid, fat, or carbohydrate ingested?

(4) What are the main lines on which you would work in regard to the prevention of enteric fever? Under what conditions can a man be at his duty in barracks and yet act as a focus of enteric fever?

(5) You are, as regimental medical officer, called upon to pronounce on the fitness, or otherwise, of the water of a small stream, for the supply of your battalion, for one or two days. Describe the procedure you would adopt: (*a*) If the water were required at once; (*b*) if not required till the end of a week.

Hygiene. Practical Examination.—Saturday, April 23, 1910. From 10 a.m. to 1 p.m.

(1) Estimate the quantities, in parts per 100,000, of the following in the water before you: Nitrites; hardness, total; hardness, permanent.

(2) Ascertain whether any preservatives are present in the sample of milk.

(3) Estimate the CO_2, due to the combustion of gas and to respiration, present in the air of the laboratory, in the place which will be pointed out to you. The temperature and pressure are recorded on the blackboard.

Pathology. Written Examination.—Tuesday, April 26, 1910. From 10 a.m. to 1 p.m.

(1) Describe the chief abnormalities which may be encountered in the blood as regards the numbers and characters of the erythrocytes, and comment on the pathological significance attaching to such abnormalities.

(2) Give a concise account of the morphological and cultural characteristics of the principal pyogenic organisms.

(3) Describe in detail the various forms of the parasite of malignant tertian malaria which are met with in the human host.

(4) Define the following expressions: (*a*) Colour index; (*b*) opsonic index; (*c*) positive phrase; (*d*) virulence; (*e*) symbiosis; (*f*) merozoite.

Pathology. Practical Examination.—Friday, April 22, 1910. From 10 a.m. to 1 p.m.

(1) Make a careful examination of the bacterial culture with which you are provided, and record in your paper the various steps in this examination and your results. Leave a stained film beside your microscope, properly labelled.

(2) Stain the unfixed films made from a pathological secretion, so as to demonstrate the presence, 1st, of Gram-staining organisms; 2nd, acid-fast bacteria. Mention in your paper the results of your examination, including the probable nature of the secretion and of any germs which you may have found. Leave your specimen in focus under your oil-immersion lens.

(3) Examine carefully the stained film of malarial blood marked with your number, and write an account of what you have found. What variety of malaria was present, and what forms of the parasite were most numerous?

Military Surgery.—Friday, April 22, 1910. From 2.30 to 5.30 p.m.

(1) What are the characteristic features of wounds from the various forms of artillery projectiles?

(2) Explain the causation of secondary hæmorrhage in gunshot wounds, and give briefly its treatment.

(3) Give a short description of gunshot wounds of joints, with their symptoms and treatment.

(4) Describe the gunshot injuries met with in the spinal cord, and discuss their diagnosis, prognosis and treatment. (25 marks for each question.)

Tropical Medicine.—Monday, April 25, 1910. From 2.30 to 5.30 p.m.

(1) Mention three diseases found in the Tropics of which acute diarrhœa may be a prominent symptom. How would you arrive at a definite diagnosis in each case?

(2) Discuss the symptoms and treatment of tropical abscess of the liver.

(3) What is known as to the causation of tropical beri-beri?

(4) Sketch a line of treatment for a case of chronic malaria with frequent relapses.

Military Medical Administration.—Saturday, April 23, 1910. From 2.30 to 5.30 p.m.

(1) What are the chief points of difference in hospital establishments at home and in India?

(2) Give concisely the chief methods of transporting sick and wounded on land.

(3) How does a Cavalry field ambulance differ from a Field ambulance?

(4) What several branches of the Army deal with the following:—

Repairs to buildings, transport, washing of hospital linen, diets, furniture, bedding, ammunition, gas?

(5) Write an official letter asking for three days' leave.

ROYAL ARMY MEDICAL COLLEGE.

Names of prize winners and prizes gained at the First Junior Course Examination, 1910, for Lieutenants.

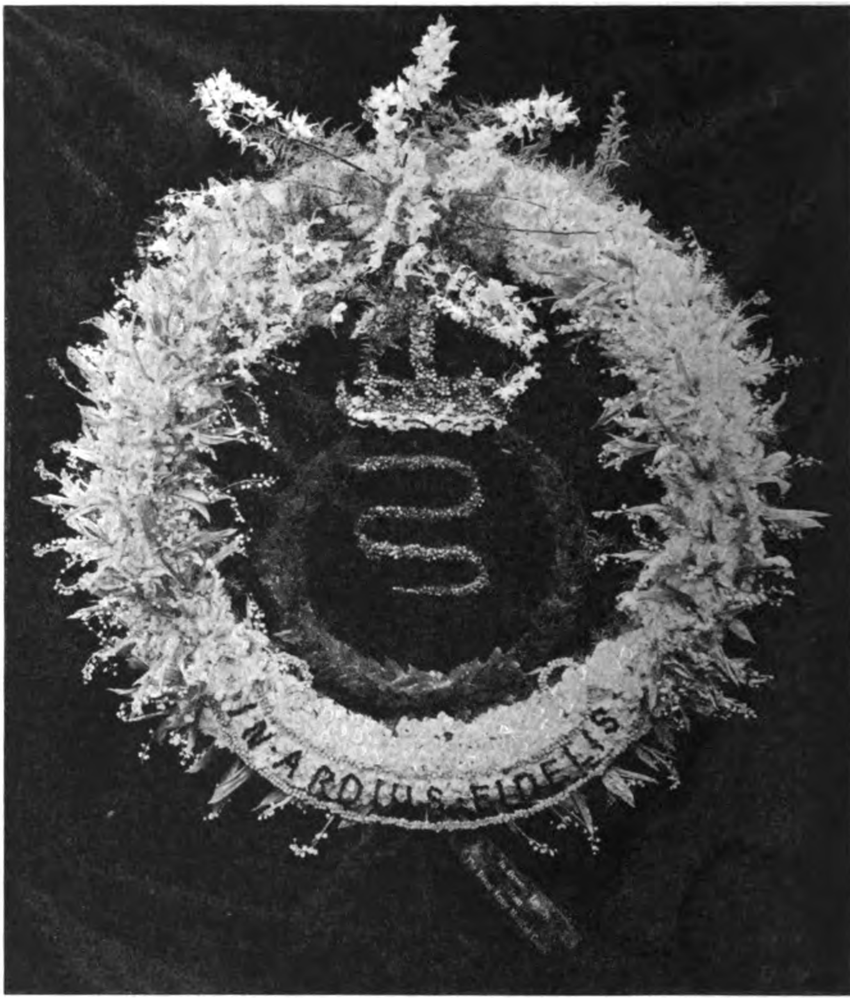
Lieutenant L. C. Hayes, "Herbert," "Tulloch Memorial," and "Ranald Martin."
Lieutenant C. Robb, "2nd Montefiore" and "Marshall Webb."
Lieutenant E. M. Parsons-Smith, "Parke's Memorial."
Lieutenant W. P. MacArthur, "De Chaumont."

THE FUNERAL OF HIS LATE MAJESTY KING EDWARD VII.

Wreath from the Royal Army Medical Corps.

As a mark of respect from all ranks of the Corps, Regular, Special, Reserve, and Territorial, a wreath was sent to Windsor Castle, on behalf of the Royal Army Medical Corps, on the occasion of His late Majesty's funeral.

The wreath, 4 feet 6 inches in diameter, was composed of a solid foundation of white double narcissi covered with lilies of the valley and odontoglossum and Alexandra orchids. The crest, inset on the inner circle of the wreath, was carried out in bay leaves and red berries, with a brown staff, and a shaded blue green serpent in everlastings. The crown was in scarlet geraniums and gold Cape flowers, with white stock and reed tails for the ermine, and ruby geraniums, lily heads and emerald immortelles



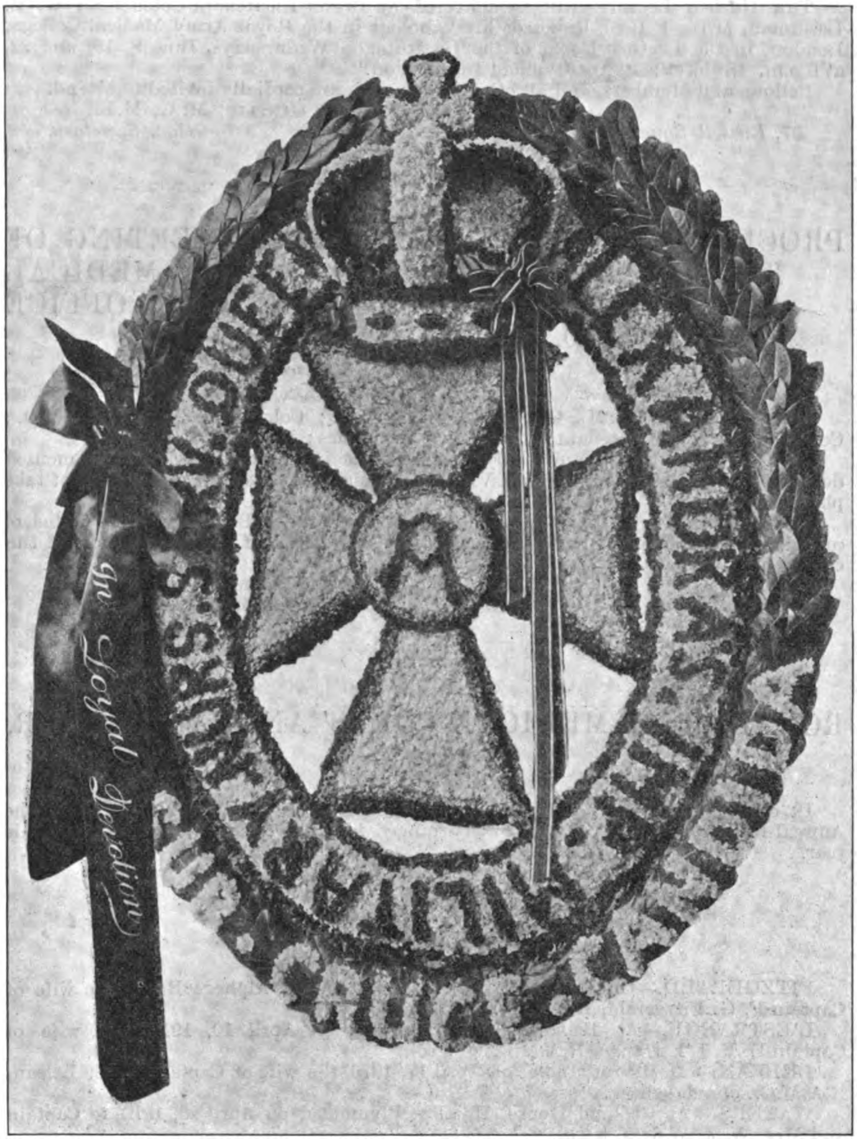
for the jewels. The motto was in black berries on white stock, bordered with gold Cape flowers.

Attached to the lower part of the wreath, a Royal purple satin ribbon with gold lettering bore the inscription, "In devoted loyalty from the Royal Army Medical Corps."

WREATH FROM QUEEN ALEXANDRA'S IMPERIAL MILITARY NURSING SERVICE.

The wreath sent by Queen Alexandra's Imperial Military Nursing Service consisted of a chaplet of laurel leaves, 7 feet in height, surrounding the badge of the Service.

The Danish cross with the letter A in the centre was beautifully carried out in white stock, white heather and scarlet geranium. The badge was surmounted by a crown and the motto of the Service, "Sub cruce candida," in white flowers, rested on the



laurel wreath below. A large knot of the badge ribbon was attached at the top, and a broad black ribbon, on which was written in gold "In loyal devotion," completed the design.

THE ROYAL INSTITUTE OF PUBLIC HEALTH.

THE HARBEN LECTURES, 1910.

THE Harben Lectures will be delivered by Brevet-Lieutenant-Colonel Sir W. B. Leishman, M.B., F.R.S., Professor of Pathology in the Royal Army Medical College, London, in the Lecture Room of the Institute, on Wednesdays, June 8, 15, and 22, at 6 p.m. Subject: "Anti-typhoid Inoculation."

Fellows and Members, and all others interested, are cordially invited to attend.

JAMES CANTLIE, M.A., M.B.,
Hon. Secretary.

37, *Russell Square, W.C.*

PROCEEDINGS OF AN EMERGENCY MEETING OF THE COMMITTEE ROYAL ARMY MEDICAL CORPS FUND HELD AT THE WAR OFFICE MAY 12, 1910.

Present.

Surgeon-General D. L. Gubbins, C.B., M.V.O.; Colonel D. Wardrop, C.V.O.; Colonel Peterkin; Lieutenant-Colonel H. E. R. James; Major E. T. Birrell.

(1) The Committee unanimously decided that in consequence of the lamented death of His Majesty King Edward VII, the Annual Dinner of the Corps will not take place this year.

(2) The Secretary of the Dinner Sub-committee (Major Birrell) was instructed to cancel all arrangements for the dinner, and to issue notice of the cancellation at the earliest possible date.

F. W. H. DAVIES HARRIS,
Lieutenant-Colonel,
Secretary.

ROYAL ARMY MEDICAL CORPS' ANNUAL DINNER, 1910.

IN consequence of the lamented death of His Majesty King Edward VII., the Annual Dinner of the Corps, which was arranged for June 13, will not take place this year.

BIRTHS.

FITZGERALD.—On March 22, 1910, at Catton, St. Alphege Road, the wife of Captain F. G. Fitzgerald, R.A.M.C., of a daughter.

L'ESTRANGE.—At Bellary, Southern India, on April 10, 1910, the wife of Captain E. F. L'Estrange, R.A.M.C., of a son.

LELEAN.—At Meerut, India, on April 17, 1910, the wife of Captain P. S. Lelean, R.A.M.C., of a daughter.

WATERS.—At Redland House, Hartley, Plymouth, on April 20, 1910, to Captain and Mrs. W. J. Waters, a son.

HEFFERNAN.—At Dublin, on May 19, 1910, the wife of Lieutenant-Colonel W. Heffernan, R.A.M.C., of a daughter.

DEATHS.

MILLER.—On April 8, 1910, Surgeon-Major Ormsby Bowen Miller, half pay, Army Medical Department, aged 77. He entered the Service on March 28, 1854, served in the 77th Foot, 11th Dragoons, 14th Hussars, Military Train, &c. He became Surgeon September 9, 1864, Surgeon-Major March 1, 1873, and retired on half pay on October 17, 1875. His war service was: Crimean Campaign, 1854-5; Battles of the Alma and Inkerman; Siege and fall of Sevastopol. Medal with three clasps; Turkish medal; 5th class Medjidie.

SPARKES.—On April 23, 1910, Lieutenant-Colonel Claude Stephen Sparkes, R.A.M.C., aged 51. He entered the Service on August 1, 1885, became Surgeon-Major August 1, 1897, and Lieutenant-Colonel August 1, 1905. His war service was: Sikkim Expedition, 1888; Medal with clasp. South African War, 1902; Operations in the Transvaal, March to May 31, 1902; Operations in Orange River Colony, February to March, 1902; Operations in Cape Colony, February, 1902. Queen's Medal with four clasps.

HINTON.—On May 6, 1910, Honorary Brigade Surgeon James Hinton, retired pay, late Army Medical Department. He entered the Service on March 10, 1858, served on the staff and in the 15th Foot, 10th Hussars, and Army Medical Department. He became Surgeon March 1, 1873, Surgeon-Major April 1, 1873, and retired with the honorary rank of Brigade Surgeon, May 20, 1882.

CAMERON.—At Aldershot, on May 7, 1910, from tetanus, Major Kenneth Mackenzie Cameron, R.A.M.C., aged 41. He entered the Service on January 29, 1894, became Surgeon-Captain January 29, 1897, and Major October 29, 1905. His war service was: Operations on North-West Frontier of India, 1897-8. With Tirah Expeditionary Force; medal with two clasps. South African War, 1899-1902; Operations in Natal, 1899, including actions at Rietfontein and Lombard's Kop; Defence of Ladysmith, including action of January 6, 1900; Operations in Natal (March to June, 1900); Operations in the Transvaal, east of Pretoria, July to November 29, 1900. Despatches, *London Gazette*, February 8, 1901. Queen's medal with four clasps; King's medal with two clasps.

EXCHANGES, &c.

A free issue of twenty-five excerpts will be made to contributors of all articles classified under the heading of Original Communications, Lectures, Travels, and Proceedings of the United Services Medical Society.

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	8	0 9 0	0 4 4				
	16	0 16 9	0 6 9				
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Notices.

EDITORIAL NOTICES.

The Editor will be glad to receive original communications upon professional subjects, travel, and personal experiences, &c. He will also be glad to receive items of news and information regarding matters of interest to the Corps from the various garrisons, districts, and commands at home and abroad.

Matter intended for the Corps News should reach the Editor not later than the 15th of each month for the following month's issue. Notices of Births, Marriages, and Deaths are inserted free of charge to subscribers and members of the Corps. All these communications should be written upon one side of the paper only; they should by preference be type-written, but, if not, all proper names should be written in capital letters (or printed) to avoid mistakes, and be addressed The Editor, "JOURNAL OF THE ROYAL ARMY MEDICAL CORPS," War Office, Whitehall, London, S.W.

Communications have been received from Captain J. H. Barbour, Lieutenant-Colonel C. Birt, Captain W. N. Boyce, Lieutenant A. G. Wells, Lieutenant-Colonel W. A. Morris, Major S. L. Cummins, Captain J. A. Balck, Lieutenant-Colonel C. H. Melville, Major C. E. Pollock, Captain L. W. Harrison, Captain R. G. Anderson, Major F. J. Wade-Brown, Captain R. E. U. Newman, Surgeon-Major R. Samut, Major W. S. Harrison, Major G. A. Moore, Major F. J. W. Porter, Lieutenant-Colonel B. M. Skinner.

The following publications have been received:—

British: The Indian Medical Journal, Army and Navy Gazette, The Middlesex Hospital Journal, The Practitioner, Proceedings of the Royal Society of Medicine, The Journal of Tropical Medicine and Hygiene, Medical Press and Circular, The Lancet, St. Bartholomew's Hospital Journal, The British Journal of Tuberculosis, Journal of the Royal Sanitary Institute, The Royal Engineers' Journal, Guy's Hospital Gazette, The Hospital, The Medical Review, Public Health, Red Cross and Ambulance News, The Shield, Journal of the Royal United Service Institution.

Foreign: Giornale de Medicina Militare, The Military Surgeon, Le Caducée, Archiv für Schiffs- und Tropen-Hygiene, United States Department of Agriculture, Revista de Sanidad Militar y La Medicina Militar Española, Bulletin de l'Office International d'Hygiene Publique, American Medicine, Japanese Medical Journal, Report of the Department of Sanitation of the Isthmian Canal Commission, Annali di Medicina Navale e Coloniale, Le Cruz Roja.

MANAGER'S NOTICES.

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